C I N T R A F O R

Working Paper 87

A COMPETITIVE ASSESSMENT OF THE JAPANESE FORESTRY AND FOREST PRODUCTS SECTORS

Ivan L. Eastin
Paul Boardman
John Perez-Garcia

February 2002

CENTER FOR INTERNATIONAL TRADE IN FOREST PRODUCTS
UNIVERSITY OF WASHINGTON
COLLEGE OF FOREST RESOURCES
BOX 352100
SEATTLE, WASHINGTON 98195-2100

CINTRAFOR Working Paper 87

A COMPETITIVE ASSESSMENT OF THE JAPANESE FORESTRY AND FOREST PRODUCTS SECTORS

Ivan L. Eastin
Paul Boardman
John Perez-Garcia

February 2002

This material is based upon work supported by the Cooperative State Research Service, US Department of Agriculture, and the State of Washington Department of Community, Trade and Economic Development. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the funding agency.

Technical Editors: Kendall Carson, Nicole Stevens

EXECUTIVE SUMMARY

Background to the Study

The lack of competitiveness of Japan's wood producers, continued growth in imported lumber and wood products, and a growing unmanaged timber stock on Japanese national and private forests spurred the Japanese government to review lumber imports and its relation to its depressed wood products market. Although the initial Ministry of Agriculture, Forestry and Fisheries inquiry into how exports of wood products from the US and other regions of the world have proven injurious to the domestic industry never reached a pan-ministry consensus, at the time of this writing some lumber products are still on the MAFF's list of products for potential WTO safeguard protection. A Safeguard Action under WTO guidelines requires that the Japanese government: (i) identify the affected industry, be it the forestry sector or the wood-processing sector; (ii) identify the affected product and its relation to substitute import products; (iii) determine how the sharp increase in imports resulted in injury to the affected industry; and (iv) determine how Safeguard measures would improve the competitiveness of the affected industry over the 4 to 8 year period it is in effect.

Study Objectives

This study, through in-country interviews, literature review, and data analysis, sought to analyze the state of the competitiveness of the Japanese forestry and wood products industries, and, using the CINTRAFOR Global Trade Model, to determine the impact of a protectionist trade policy on the domestic industry's competitive strength and upon Japanese home-buying consumers.

Summary of Findings

During the period of the writing of this report it appeared that the threat of a WTO Safeguard Action subsided. However, as of July 2001 lumber products are still officially listed by MAFF for a potential safeguard action. Though this is not a study regarding the impact of protectionism on US or foreign exports to Japan the consequence of such a protectionist action on US and foreign wood exports to Japan is large. As the study findings suggest the benefit of trade restrictions to the domestic industry is mixed with the main burden of such an action being shouldered by the Japanese consumer. Many of the reasons for the lack of Japanese forestry and wood product sector competitiveness have more to do with internal systemic issues than with external issues traceable to exports.

Potential Impact of a Safeguard Action

Although the intended objectives of the Government of Japan forestry and forest products policies and subsidies is to realize "an era of domestic timber, a Safeguard Action may have the opposite effect by increasing log imports 44%.

- A simulated 25% increase in tariffs under a Safeguard Action, causes a 20% increase in domestic lumber production and a 7% increase in domestic log production.
- Consumers of lumber products lose approximately $3 billion dollars annually. This is more than double the Forestry Agency subsidy monies supporting the forest and wood processing industry.
- The 16% increase in the price of lumber resulting from a Safeguard Action has the potential to increase home construction costs by ¥264,000 yen per house.
- Sawmills processing imported logs tend to have a higher level of average production, suggesting that a Safeguard Action may lead to consolidation in the industry, negatively impact the smaller mills that rely on domestic logs.

Forestry Industry: Internal Systemic Issues

- Japan has an unusually high cost of forestry compared to other regions of the world.
- Poor profitability in forestry is due in part to geography, such as steep terrain, which makes forest management challenging and increases the cost of harvest and extraction

- The low profitability is reflected in a Forestry Agency study which estimates that the internal rate of return from a sugi plantation has declined from 6.3% in 1965 to 4.1% in 1975 to 2.1% in 1985 to 0.9% in 1993.
- The exceedingly small size of private forests, most around 5 hectares, makes it difficult for owners to raise capital and manage efficiently.
- The depopulation and aging of the forestry and wood products workforce seriously impacts productivity and efficiency of the forestry industry. According to one survey 57% of forestry workers are over the age of 55 while less than 10% are under the age of 35.

Wood-processing Industry: Internal Systemic Issues

- Japan's harvesting and delivery costs to the mill are now nearly three times more than those costs in the US Pacific Northwest region and six times larger than those in Scandinavia and the southern hemisphere.
- Imported log prices, energy and labor costs combined with a decreasing log processing efficiency results in Japan's sawmills being high cost producers of lumber relative to their competitors.
- Electrical rates for the saw-milling sector in Japan are 3 to 4 times higher than other producers.
- The small size and scale of sawmills in Japan contribute to their lack of profitability. Production cost estimates for 1996 indicate that Japanese costs are approximately 156% higher than a sawmill in British Columbia, Canada. While labor, energy, and capital costs are less than 50% higher than BC, stumpage prices for sugi are 250% higher than hemlock.
- The performance based regulatory environment surrounding the housing industry (Housing Quality Assurance Act and the 10-Year Housing Warranty) is altering the product and species mix, displacing some domestic species. For example, demand for yellow cedar and treated lumber in ground sill (dodai) applications has also increased as a result of the 10-year Housing Warranty.

Conclusion: Protection is Not the Path to Competitiveness

Since 1955, Japan has seen its self-sufficiency in wood products decline from approximately 95% to below 20% by 2000. While there are a variety of factors that have contributed to this decline, the net effect has been that domestic forest products manufacturers have lost tremendous market share to imported wood products. Similarly, the competitiveness of the forestry sector has declined significantly relative to imported softwood logs. The dominance of the timber market by imported timber has contributed to a fundamental structural change within the forestry and forest products sector. Analysts and politicians have charged that these structural changes in the forestry and forest products sector have not only adversely affected the competitiveness of the domestic forest products sector but that they have severely restricted the ability of forest owners to actively manage forests in Japan, both private and public. In an attempt to rectify this inability to manage its forests and to bolster the competitiveness of its forestry and wood-products industries the Government of Japan has considered a Safeguard. However, the conclusion of this study is that given the burden that this trade restriction will likely cause to the Japanese consumer coupled with the probability of a significant increase in log imports, protection is not the road to profitable and well-managed forests and wood products industry. Perhaps more importantly, given the internal systemic issues described earlier, there appears to be little likelihood that a Safeguard would result in the increased competitiveness of the sawmill industry.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1. INTRODUCTION

BACKGROUND

Japan’s economy has been in a state of flux since the end of the bubble economy in the early 1990s and the 1997 Asian economic crisis. Widespread concern about the economy has caused extensive industrial restructuring, increasing numbers of bankruptcies and record post-war unemployment levels. On the way out are the days of the lifetime employment guarantee between a company and its employees. In its place is a Japan that is unsure of its place in the global economy. This change is perhaps best characterized by the recent decision by the Japanese government to apply huge import tariffs (via the WTO Safeguard provisions) on stone leeks (3% to 256%), fresh shiitake mushrooms 4.3% to 266%), and tatami mats (6% to 106%). A spate of newspaper articles has recently chronicled the calls from numerous industries (e.g., towel and sock manufacturers, sweet potato growers, eel producers, seaweed producers, lumber producers, plywood producers, glue-laminated lumber producers) for protection from lower priced imports. Of course, as with everything in Japan, a closer look reveals that the economy is divided into traditional, rural-based small agricultural producers and highly competitive urban industrial manufacturers. Examples of both of these types of producers are within the forest products industry. This report will focus on the social, economic and regulatory changes that have affected the competitiveness of this industry in Japan, beginning with an overview of economic and demographic trends in Japan.

ECONOMIC OVERVIEW

In an effort to jump-start the economy, Japanese politicians have dramatically increased government spending (Japan’s gross debt is now over 110% of GDP, compared to 58% in 1991), while interest rates have been maintained near zero since 1995. The fact that these measures have not been effective is perhaps the most compelling evidence that Japan's economic woes are systemic and not purely economic. The most problematic factor is related to the bad loan problem, which plagues virtually all of the financial institutions in Japan. The bad loan problem has been attributed to questionable loans that were made during the bubble economy where inflated stock share prices and real estate values were used as collateral. For example, using 1990 as the base year, land values in urban areas jumped to 110.4% in 1991 then steadily declined to 74.7% in 2000. The government's reluctance to implement policies to directly address the bad loan problem has caused it to linger on, taking a substantial toll on the domestic economy.

The 1990s, perhaps aptly described as the post-bubble decade, was a decade of economic stagnation. During this period, GDP growth averaged a mere one percent per year. The unemployment rate jumped from 2.1% to a post war high of 4.7% and bankruptcies rose from approximately 7,000 in 1989 and 1990 to almost 20,000 in 1999. Uncertainty over the future has caused Japanese consumers to curtail their spending, resulting in a period of deflation as the consumer price index fell by 0.3% in 1999 and by almost 0.6% in 2000.

Table 1-1. Summary Statistics for Japan, 1960-2000.

	Population	Dependency ratio	GNP (Billion yen)	GNP change	Unemployment Rate (%)	Exchange Rate (yen/$US)	Consumer Price Index	Housing Starts
1960	93,419,000	8.9	71,683		1.7	358.30	18.8	424,000
1961	94,287,000	9.1	80,180	11.85%	1.4	361.77	19.7	536,000
1962	95,181,000	9.1	87,073	8.60%	1.3	358.20	21.1	586,000
1963	96,156,000	9.1	94,724	8.79%	1.3	361.95	22.7	689,000
1964	97,182,000	9.2	105,320	11.19%	1.1	358.30	23.5	751,000
1965	98,275,000	9.2	111,294	5.67%	1.2	360.90	25.0	842,596
1966	99,036,000	9.4	122,700	10.25%	1.3	362.47	26.4	856,579
1967	100,196,000	9.6	136,300	11.08%	1.3	361.91	27.3	991,158
1968	101,331,000	9.8	152,532	11.91%	1.2	357.70	28.9	1,201,675
1969	102,536,000	10.0	170,765	11.95%	1.1	357.80	30.4	1,346,612
1970	103,720,000	10.2	188,323	10.28%	1.1	357.65	32.3	1,484,556
1971	105,145,000	10.4	196,589	4.39%	1.2	314.75	34.4	1,463,760
1972	107,595,000	10.7	213,129	8.41%	1.4	301.10	36.0	1,807,581
1973	109,104,000	11.0	230,249	8.03%	1.3	280.00	40.2	1,905,112
1974	110,573,000	11.3	227,428	-1.23%	1.4	300.94	49.6	1,316,100
1975	111,940,000	11.7	234,459	3.09%	1.9	305.15	55.3	1,356,286
1976	113,094,000	12.0	243,779	3.98%	2.0	293.00	60.6	1,523,844
1977	114,165,000	12.4	254,481	4.39%	2.0	240.00	65.5	1,508,260
1978	115,190,000	12.8	267,898	5.27%	2.2	195.10	68.3	1,549,362
1979	116,155,000	13.2	282,589	5.48%	2.1	239.90	70.8	1,493,023
1980	117,060,000	13.5	290,551	2.82%	2.0	203.60	76.3	1,268,626
1981	117,902,000	13.9	299,763	3.17%	2.2	220.25	80.0	1,151,669
1982	118,728,000	14.2	308,927	3.06%	2.4	235.30	82.3	1,146,149
1983	119,536,000	14.4	316,101	2.32%	2.6	232.00	83.8	1,136,797
1984	120,305,000	14.6	328,484	3.92%	2.7	251.58	85.7	1,187,282
1985	121,049,000	15.1	342,950	4.40%	2.6	200.60	87.4	1,236,072
1986	121,660,000	15.4	352,880	2.90%	2.8	160.10	88.0	1,364,609
1987	122,239,000	15.8	367,556	4.16%	2.8	122.00	88.0	1,674,300
1988	122,745,000	16.2	390,325	6.19%	2.5	125.90	88.6	1,684,644
1989	123,205,000	16.7	409,184	4.83%	2.3	143.40	90.7	1,662,612
1990	123,611,000	17.3	429,986	5.08%	2.1	135.40	93.5	1,707,109
1991	124,101,000	18.0	446,315	3.80%	2.1	125.25	96.5	1,370,126
1992	124,567,000	18.7	450,877	1.02%	2.2	124.65	98.1	1,402,590
1993	124,938,000	19.4	452,282	0.31%	2.5	111.89	99.4	1,485,684
1994	125,265,000	20.2	455,197	0.64%	2.9	99.83	100.1	1,570,252
1995	125,570,000	20.9	461,894	1.47%	3.2	102.91	100.0	1,470,330
1996	125,864,000	21.8	485,219	5.05%	3.4	115.98	100.1	1,643,266
1997	126,166,000	22.7	492,954	1.59%	3.4	120.92	101.9	1,387,014
1998	126,486,000	23.6	480,587	-2.51%	4.1	115.20	102.5	1,198,295
1999	126,686,000	24.4	482,351	0.5%	4.7	102.08	102.2	1,214,601
2000	126,919,000	25.3	490,551	1.7%	4.7	106.0	101.5	1,229,843
2010	127,623,000	34.6						
2025	120,913,000	46.0						
2050	100,496,000	59.1						

***Note**: GNP statistics are constant, based on 1990.*

Finally, demographic statistics clearly indicate that Japan's trend of more aging citizens and a shrinking population will have serious implications in the near future (Table 1-1). Perhaps two statistics best summarize the demographic problem confronting Japan. First, the population of Japan is expected to peak at 127.7 million in 2005 and then decline to below 100 million by 2051. At the same time, the dependency ratio in Japan (defined as the population aged 65 and above divided by the population aged 15 to 64) jumped from 8.9% in 1960 to 25.3% in 2000 and is expected to increase to 49.4% by 2015.

Clearly the government must address two major challenges in the years ahead. In the short-term it must aggressively resolve the lingering structural problems in the financial sector that have undermined economic performance. In the longer term it must realistically confront the social and financial challenges presented by a shrinking and aging population. Addressing this demographic trend will be particularly problematic in a country where immigration has not been traditionally viewed as an acceptable option.

TIMBER SUPPLY AND DEMAND

Timber Self-Sufficiency

During the post-war era, Japan went from being essentially self-sufficient in meeting its timber demands to relying on imports for more than 80% of its timber requirements (Figure 1-1). From 1955-2000, domestic timber production steadily declined from approximately 65 million m3 to less than 20 million m3. Timber imports, on the other hand, have increased tremendously, jumping from 2.5 million m3 in 1995 to almost 90 million m3 in 1996 before dropping off to 75 million m3 during the current economic recession. Overall, timber demand has generally followed the economy, increasing during period of economic growth (1960-1972 and 1985-1991) and declining during periods of slow economic performance (1973-1975, 1979-1983, and 1997-2000). While timber demand suffered a sharp decline following the Asian economic crisis, virtually all of the reduced demand was absorbed by timber imports and domestic production volumes remained relatively constant during the period 1998-2000.

Lumber Self-Sufficiency

Japan's domestic lumber production volumes are a sharp contrast to its overall timber self-sufficiency. Whereas over 80% of the timber supply is derived from imports, only about 30% of Japan's softwood lumber demand is provided by lumber imports (Figure 1-2). Despite Japan's relatively high level of self-sufficiency, the domestic lumber industry has been is plagued by declining production levels as smaller, less efficient sawmills have closed down. Over the past decade, domestic lumber production has declined from 28 million m^3 to 18 million m^3, while lumber imports have remained fairly constant at approximately 9 million m^3. The combination of declining domestic production and relatively constant import volumes means that self-sufficiency has dropped from 78% in 1991 to 67% in 2000. The lumber industry was particularly hard hit by the Asian economic crisis, with the number of sawmills declining from 14,028 in 1996 to 12,810 in 1998. These sawmill closures resulted in the large declines in productive capacity in 1997 and 1998 (Figure 1-2).

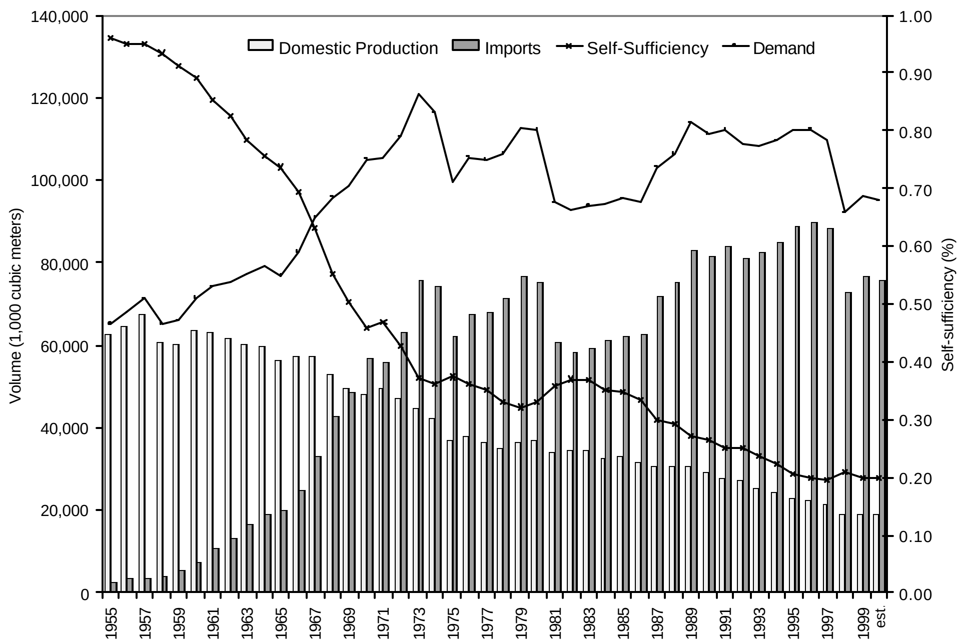


Figure 1-1. The Trend in Japanese Wood Self-Sufficiency and Imports, 1955-2000.

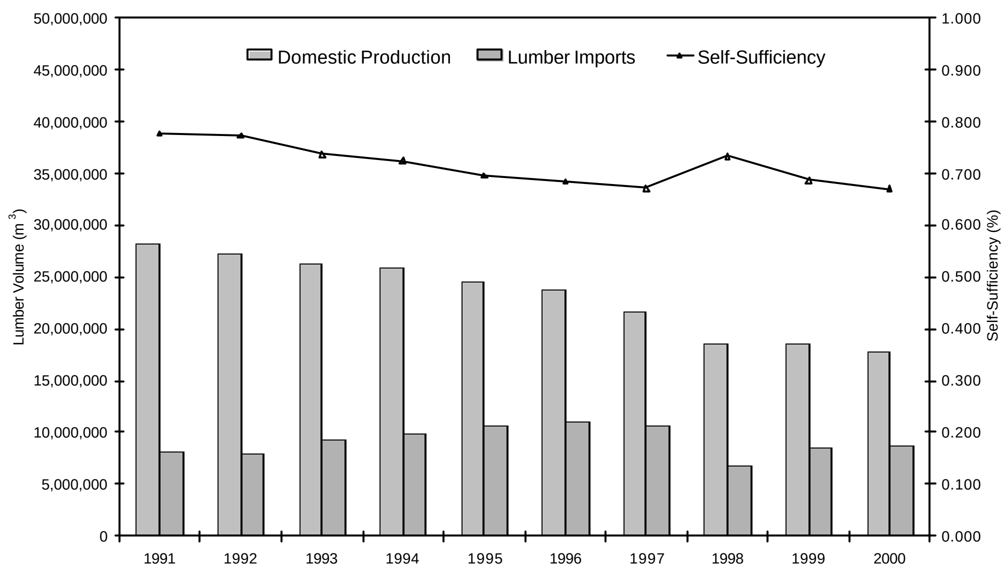


Figure 1-2. Japanese Production, Imports, and Self-Sufficiency of Lumber, 1991-2000.

HOUSING INDUSTRY OVERVIEW

Residential Construction Industry and Housing Starts

The single greatest end use for imported wood in Japan is housing construction. Analysts estimated that in 1992, 79% of lumber shipments in Japan were used in housing construction (Gaston 1997). Japan's residential housing market has consistently been one of the largest and most dynamic in the world. From 1987-1997, Japan's housing starts were approximately equal to those in the United States even though Japan has only 46.9% of the population and 3.9% of the land area of the US.

A combination of factors have historically supported the relatively high number of housing starts in Japan, including active construction of rental housing, low mortgage interest rates, active government support for inexpensive housing, sustained growth of per capita income, population growth, rapid turnover of existing housing stock, large migration to urban centers, large volumes of existing low quality housing in need of replacement, improved tax benefits for housing, and increasing land prices (JETRO 1995; Robertson and Waggener 1995; Eastin 1999). For example, since 1950 the population in Japan has doubled while average household size has fallen from 5.02 to 3.01, suggesting that smaller nuclear families are replacing traditional extended family living situations (Robertson and Waggener 1995). The growing population and the number of nuclear family households has helped support the demand for housing.

While the long-term trend has been an increase in Japan's population, recent population statistics and demographic projections clearly show that the birth rate is declining and average life expectancy is increasing. This combination of demographic trends suggests that the population in Japan will begin to decline after 2010. As a result, demand for new housing is also expected to decline and most demographers estimate that housing starts in Japan will stabilize at around 1.1 million from 2002-2010 before declining to approximately 800,000 to 900,000 starts per annum.

In 2000, housing starts in the US and Japan totaled 1.53 million and 1.23 million units, respectively (Figure 1-3). Housing starts in the US and Japanese have tended to follow world economic trends while exhibiting differences based on domestic trends as well. The economies of both countries grew rapidly in the early 1970s, as indicated by the high level of housing starts, until 1973 when the OPEC oil crisis slowed the economies and contributed to a decline in the number of new housing starts. Both countries also experienced housing slumps in the early 1980s and early 1990s in response to the second oil crisis and the Persian Gulf War, respectively.

In Japan, the number of housing starts built was very high during the late 1980s (the so-called Bubble-Economy) and in 1996. 1996 was the first time since the bubble economy when housing starts increased at double-digit rates over the previous year. The high number of housing starts in 1996 has been attributed, in part, to the rebuilding after the 1995 Hanshin Earthquake in Kobe. The Kobe earthquake damaged approximately 147,600 houses (Japan Lumber Reports 1995) and displaced over 400,000 households (Pacific Rim Wood Market Report 1996). There were many new housing starts in 1996 also because homeowners rushed to purchase houses before the Ministry of Finance increased the national consumption tax from 3% to 5% on April 1, 1997. Since the increased consumption tax applied to housing construction, consumers wanted to avoid paying hundreds of thousands of yen in extra taxes.

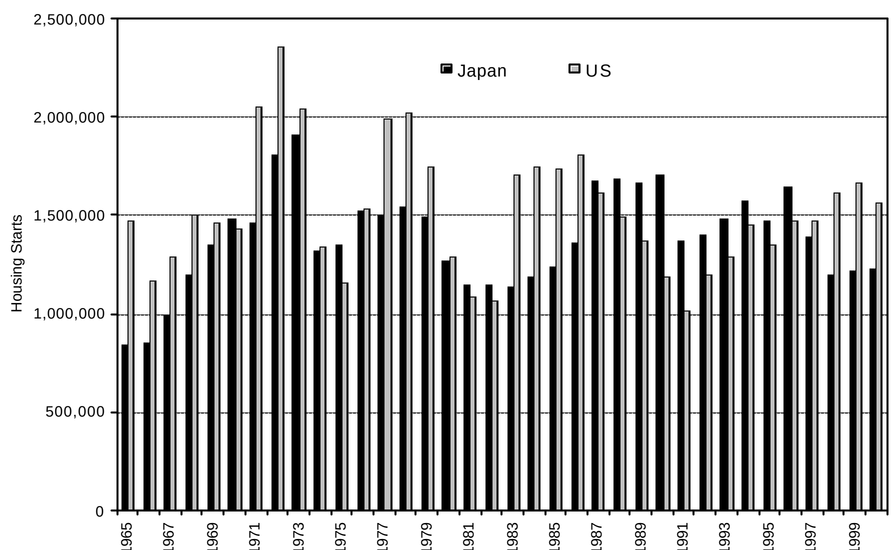


Figure 1-3. Comparison of Japanese and US Housing Starts, 1965-2000.

Since 1997, Japan's continuing economic difficulties have had a devastating impact on the country's housing industry. Thousands of contractors have gone out of business and the number of new housing starts has declined from 1.66 million units in 1996 to just 1.23 million units in 2000 (the outlook for 2001 is approximately 1.1 million units). Not surprisingly, the decline in the number of housing starts has adversely effected US wood product exports to Japan. Exports of primary wood products declined 53% and secondary wood products declined 46% from 1996 to 1999. The impact of the Asian recession and the decline in the number of housing starts has been compounded by the surprising strength of the yen and the relative weakness of the Canadian dollar and the Euro. The strong US dollar compared to the weak yen and Euro has reduced the competitiveness of US wood products in Japan and European exports of softwood lumber to Japan have increased dramatically, largely at the expense of US and Canadian hemlock exports. From 1989-2000, the US share of Japan's softwood lumber market declined from 48.3% to 5.6% and the Canadian share decreased from 50.9% to 43.9%. At the same time, the European market share increased from 0% to 25.1%.

Residential Housing Types

One way that residential housing can be classified is by occupancy type: single-family detached versus multiple-family collective housing residences (including apartments (mansions, or condominiums) (JETRO 1996a). In 1999, multi-family homes made up the majority of total housing starts at 50.7%, down from 53.6% in 1998. Despite this drop, there is a clear trend towards multi-family residences in densely populated urban areas. In Tokyo for example, 65.3% of all residences are multi-family. Throughout all of Japan however, multi-family units comprise only 41.8% of new construction.

Housing starts can also be segmented by the type of structural material used (e.g., wood, steel, or reinforced concrete). Wood has always been an important part of the Japanese culture and trees were thought to be the places where the native gods first descended to earth. As a result, wood has traditionally had strong religious meaning and most temples and shrines are built using wood. The Japanese people are deeply drawn to the aesthetic beauty, strength, and aroma of wood, and Japanese consumers place a high value on using wood in their homes. A survey conducted by the Japanese Prime Minister's Office showed that, if given a choice, nearly 80% of Japanese homeowners would prefer to live in a wood house (Coaldrake 1990).

Residential construction was dominated by wooden housing well into the mid-1970s, accounting for almost two-thirds of all housing in 1976 (Figure 1-4). However, continued growth in multi-family housing and prefabricated single-family housing has contributed to the declining share of wooden housing. In 2000 wooden housing represented just over 45% of all housing starts in Japan. There are three main types of wooden housing built in Japan: traditional Japanese post-and-beam houses, 2x4 (both Japanese-style and North American-style), and prefabricated houses. The 2x4 housing industry has grown within the wooden house segment (JETRO 1996a; Japan Lumber Journal 1998a). Japanese houses are typically replaced every 20-25 years and most new homes are built on sites where the previous home has been demolished (Eastin 1994). Given the poor quality of most of the older post-war housing, it is generally considered more cost-effective and efficient to demolish older homes rather than repair or remodel them (Eastin 1994).

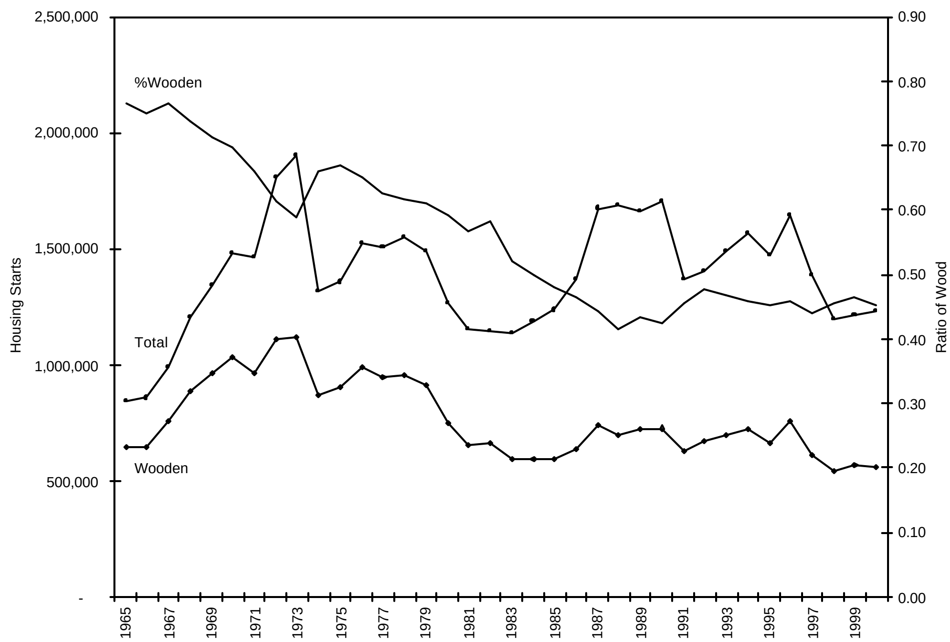


Figure 1-4. Wooden Housing Starts as a Percentage of Total Housing Starts, 1965-2000.

Financing for new houses is another way that government and industry associations have segmented the residential housing industry (Japan Lumber Journal 1998a). The two sources of construction financing are private and public. Just over 55% of new homes were financed through public sources in 1999. The remaining homes are financed through public mortgage lenders, in particular the Government Home Loan Corporation (GHLC), which provided 37.5% of all mortgage funding in 1999. The GHLC was established by the government in 1950 to provide low interest mortgages to middle-class homebuyers (JETRO 1995). The interest rate for GHLC mortgage loans is well below market interest rates and in April 2001 the GHLC interest rate was 2.55% (Japan Lumber Journal 2001). The GHLC has strict rules regarding eligibility criteria for potential borrowers and house size. In 1993, it raised the income ceiling for eligible borrowers to ¥13.225 million to allow a larger proportion of the population to qualify for GHLC mortgage loans. The GHLC also increased the allowable floorspace for homes it would finance from 2,370 ft2 to 2,580 ft2. This resulted in a record 667,118 mortgages being granted by GHLC in 1994.

Residential Housing Industry Structure

Housing is mainly built in new towns and owner occupied in-fill housing (JETRO 1996a). Subdivision sales are like sales in the US where a developer sells both the new house and land in a new residential development. These developments, often referred to as new towns, are generally built by companies that specialize in large subdivision developments. They develop land tracts, sell the houses, and usually design and build the house. Other companies acquire small tracts of land to develop and sell houses. These are the tateuri (build and sell) or mansion (condominium) companies. Incidentally, in Japan, the term mansion refers to high-rise apartments or condominiums that generally have a smaller floor area than detached single-family houses.

Owner occupied housing refers to new residential houses built contracted by the homeowner. In most cases, the homeowner demolishes an existing home and builds a new house in its place. These homes are generally custom built and, given the very high cost of land in urban areas of Japan, they are designed to fit the shape and size of the lot to maximize the floor area (McKellar 1995). The owner has very strict specifications for their new house and their input is constantly solicited throughout the design and construction process. As suggested by Leonard Guss Associates, Inc. (1992), homes with a unique appearance are desired and "cookie-cutter" houses do not do well in this market segment.

JETRO (1996a) describes the three main types of Japanese single-family house builders as: 1) large, national housing manufacturers, 2) medium-sized, regional housing companies, and 3) small, local homebuilders (kohmuten) and/or carpenters. The large housing manufacturers have powerful nation-wide sales networks. In fiscal 1999, there were eight large housing manufacturers who each had annual sales of approximately 10,000 units or more. The eight largest homebuilders in Japan include: Sekisui House (63,300 homes built in 1999), Daiwa House (38,000), Misawa Homes (34,000), Sekisui Chemical (24,180), National House Industries (18,300), Asahi Chemical Industries (15,800), Sumitomo Forestry (10,550), and Mitsui Home (9,600). These firms often supply building materials manufactured in their own factories even though the actual construction may be subcontracted out to smaller companies. The regional housing companies are based in the local communities and they provide design, sales, and construction services. The medium-sized companies typically build approximately 50 to 100 houses annually. These companies see high potential growth because they construct most of the 2x4 houses whose sales are expected to grow rapidly (Pacific Rim Wood Market Report 1996). On many occasions, the actual construction is subcontracted to smaller companies.

The smallest construction companies do most of the actual construction of houses for themselves and for larger companies. Small companies include self-employed carpenters who work as labor subcontractors. Most small companies build roughly three to five houses annually, yet they have historically controlled the largest share of the housing industry. The Japan 2x4 Homebuilders Association reports that small- and medium-sized companies build most of the 2x4 houses, and large companies primarily build Japanese-style 2x4 houses, using the 3x6 tatami module (Roos and Eastin 1998). Large national companies have increased their share of the market from 20 to 30% of the single-family housing market, partly because they also build steel and reinforced concrete multi-family units, a segment whose market share has been growing in urban areas.

A survey by the Management and Coordination Agency estimated that there were 92,500 companies directly involved in wooden house construction in Japan in 1995 (JETRO 1996a). In addition, there were about 62,000 firms operating mainly as carpentry subcontractors. The average number of workers employed by each construction company was 5.1, while the average number of workers employed by carpentry businesses was 2.9. These figures illustrate the fact that the majority of companies in the residential construction industry are small operations.

When a large construction company gets an order to build a house, it typically subcontracts the work to a construction company that in turn, subcontracts work to companies that specialize in various sub-trades such as foundation, framing, roofing and electrical work. After this level of subcontractor, there is usually another layer of subcontractors that do the construction. Levy (1990) suggests that there are potentially seven layers of subcontractors between the consumer and the actual workers who build the house. This complex system is referred to as the “multi-layered” or “multi-tiered” subcontracting structure (JETRO 1996a). This system makes building a house in Japan more complex, more time consuming, and more expensive than in the US. Building a house in Japan is also different than in the US because it is common to include labor costs when invoicing material costs. This practice, called the total material and labor system, makes it difficult to calculate the construction cost of a house (JETRO 1996a).

Changing Nature of the Residential Housing Market

Historically, post-and-beam housing had dominated the residential housing market. In 1963, 86.2% of all residential housing starts were traditional post-and-beam construction (JAWIC 2001). However, in 2000, they represented only 36.3% of all new residential housing starts as substantial inroads have been made by the steel and ferro-concrete construction industry (JAWIC 2001). Since 1968, the share of multiple-family housing units has increased 16.6%. High-rise, high-density condominiums or mansions characterize multiple-family housing where steel and concrete are used to ensure structural integrity as specified in the building codes. In large cities such as Tokyo and Osaka, high-rises are an absolute necessity to house the enormous population. Japan is already one of the most densely populated countries in the world with 857.1 people per square mile, yet the country's population density increases to 2,571.3 people per square mile because only about 33% of Japan is habitable. The other 67% is made up of mountains, farmland, forests, and uninhabitable terrain. In addition, for many people, mansions are more affordable than detached single-family homes (WWPA 1994). The main drawback to mansions is that their floor space is substantially less than the typical single family home. On average, the floor space of a single-family home is 2.7 times greater than a mansion or condominium (JETRO 1996a).

Inroads by prefabricated and 2x4 houses have further reduced the market share of post-and-beam houses. Prefabricated units built of "all materials" comprised about 13.8% of residential housing starts in 2000 (Japan

Lumber Journal 2000a). In addition, 2x4 units comprised about 6.4% of residential housing starts in 2000. Post-and-beam housing construction has also decreased due to the aging labor force. Many young people do not want to work in the construction industry because it can be dirty and dangerous. The construction industry is not viewed as a favorable place to work because of a poor industry safety record in past years. It also takes seven years of apprenticeship training to become a post-and-beam carpenter-another factor that discourages entrance into this profession (Cohen et al. 1996). As a result, the average age of a carpenter is now almost 54 years old.

Although Japan might have traditionally been characterized as a culture that shuns outside ideas and people, consumers in Japan increasingly prefer the look of western-style architecture and the open floor plans of western homes (JETRO, 1996a). This is especially true with the younger generation where a greater proportion of the population has lived or traveled overseas. The strong yen that accompanied the bubble economy of the 1980s and early 1990s allowed many Japanese to travel overseas and experience other cultures and lifestyles. In addition, there are significant numbers of Japanese who have lived overseas through business transfers within multinational corporations, overseas study, and home-stay visits. These Japanese have seen the quality of housing in other cultures and are now demanding this same high quality for their own houses in Japan.

To say that many Japanese are dissatisfied with the quality of housing in Japan would be an understatement. A 1993 MOC survey showed that 49.4% of households were not satisfied with the condition or quality of their housing condition. Among the more commonly cited reasons were inadequate space, inferior room layout, poor noise cushioning, inadequate thermal insulation, and general wear and tear of their houses (JETRO, 1996a). There is great interest in matching the quality of their housing with their wealth and consumer spending power. In addition, a recent article in the Japan Times cited the increasing number of homeowner complaints about shoddy construction practices in new homes. From 1991 to 2000, complaints about housing defects increased by 325%, with leaky roofs, cracked walls, sloping floors/walls, creaky floorboards, and doors and windows that do not close properly are the most common complaints (Japan Times 2000, 2001).

Regulatory Reforms

Building Standard Law

In May 1998 the Building Standard Law of Japan (BSL) received its first major revision since 1950. The major revisions to the BSL were to: (1) specify interim and final building inspections and (2) transform the BSL from a specification-based building code to a performance-based building code. The first revision of the BSL requires that all residential housing units receive an interim and final inspection. Further, completion of the interim inspection is required before a building is eligible to receive its final inspection. Since there are only approximately 1,800 building inspectors in Japan, the BSL revisions will enable private construction inspection firms to be established. To provide guidance to the private inspection firms, a qualification system and standards has been established within the revised BSL. In the future, contractors will be allowed to obtain a construction inspection from either a private construction inspector or an inspector from the local government agency. Although the BSL revisions went into effect in May 1999, given the shortage of inspectors in Japan, and the fact that many municipalities have not yet adopted the new inspection procedures, it is only now being phased in.

The second revision transformed the BSL from a specification-based standard to a performance-based standard. In the future, it is expected that any building material that meets the performance standards can be used in residential construction. While there is no mention about whether there will be reciprocity on test standards, the use of foreign test data is allowed in principle. Reciprocity would allow US firms to use the results of product tests conducted in the US to meet the performance standards in Japan to gain acceptance of their products. In addition, it is unclear how this change in the BSL will impact firms that have already gained Section 38 code approval for their products under the previous version of the BSL, though a two-year grace period is allowed.

Housing Quality Assurance Act (HQAA)

In addition to revising the BSL, the Housing Quality Assurance Act (HQAA) was also promulgated to provide homebuyers with specific safeguards in resolving disputes with building contractors. The four objectives of the HQAA are to: (1) improve the quality and performance of residential homes, (2) provide homebuyers with a mechanism for resolving disputes with building contractors, (3) establish a system of "Housing Performance Indication Standards" against which specific houses can be compared, and (4) establish a housing completion guarantee system. The HQAA, which went into effect in April 2000, will significantly change the nature and structure of the residential construction industry in Japan, including the specification and use of domestic and imported wooden building materials. A more detailed assessment of the individual components of the HQAA is presented below.

The first objective of the HQAA is aimed at improving the quality and performance of new homes by requiring homebuilders to provide homebuyers with a ten-year warranty against structural defects and low durability (e.g., water infiltration into the structure). Under the guidelines of the HQAA, homebuyers may make claims against homebuilders if the structural performance or durability of a home is judged to be sub-standard relative to a specific set of judgement criteria (which have yet to be published). These judgement criteria, which are expected to be published soon as a set of "Judgement Standards for Defects," will be prescriptive in nature and likely very detailed. For example, it is expected that a floor found to have a slope exceeding 6/1000 would require the contractor to level the floor.

Since 1982 the Organization for Housing Warranty (affiliated with the Ministry of Land, Infrastructure and Transportation) has provided ten-year warranties for registered builders. Builders wishing to register with OHW simply pay a modest registration fee. As members of OHW, builders are required to cover all warranty costs during the first two-years of the warranty period. However, during the remaining eight years of the warranty the builder is responsible for only a set amount of a warranty claim, with the remaining amount covered by OHW. Analysts speculate that the two-year exemption period may be removed given the fact that OHW has only paid out approximately ¥50 million, yet it has received registration fees in excess of ¥12 billion. Since the ten-year housing warranty guarantee is now mandatory, it will be interesting to see if OHW continues to provide registrations to all builders, regardless of size, financial stability, or qualifications.

There are a number of implications associated with this first component of the HQAA that are important to US manufacturers and exporters of wooden building materials. First, many small homebuilders will find it difficult to provide the requisite ten-year warranty and they will be forced to either go out of business or become subcontractors for larger, more financially stable firms. Second, most builders will look to use higher quality building materials. This trend is already reflected in the fact that the use of dimensionally stable kiln-dried lumber in home construction, and the volume of new dry-kiln capacity in Japan has increased dramatically in Japan. Similarly, the use of glulam posts and beams has increased significantly, providing a tremendous market opportunity for kiln-dried European lamstock. Finally, homebuilders may look to manufacturers and exporters of wooden building materials to provide extended warranties for their products and in essence try to push the warranty responsibility back down the distribution channel towards export consolidators and manufacturers.

The second objective of the HQAA is to establish a mechanism for resolving disputes between homebuyers and builders. To accomplish this objective, the HQAA mandates the establishment of Alternative Dispute Resolution (ADR) bodies in each prefecture in Japan. Each ADR will employ a lawyer to reconcile disagreements between builders and their customers during the ten-year warranty period. Using the "Judgement Standards for Defects" as a guide, the lawyer will judge the severity of the defect against the standard to determine if a defect exceeds the allowable guidelines. If a defect is judged to be in excess of the allowable standard, the builder will be required to correct the defect or compensate the homeowner.

The third objective of the HQAA is to establish a voluntary system of “Housing Performance Indication Standards” against which the performance of individual houses can be compared. The specific types of performance characteristics contained in this provision of the HQAA include: (1) structural performance, (2) fire safety, (3) durability, (4) ease of maintenance and management, (5) energy efficiency, (6) air quality, (7) ratio of exterior openings to total wall area, (8) noise transmission, and (9) barrier free design. The performance of individual houses will be judged by a “Designated Evaluation Body” using the criteria established in the “Japanese Housing Performance Indication Standards”. These evaluation bodies will be responsible for approving the architectural design of the house and they will also perform inspections of the home during the construction process including the foundation process, structural framing process, and interior finishing phases of the project. Houses that meet or exceed the performance indication standards will receive certification that designates it a “Performance Recognized House”, which will provide the builder with a way to differentiate their home in their marketing material from those of their competitors.

This section of the HQAA also enables manufacturers of building components that meet the performance standards to become certified as “Authorized Manufacturers of Performance Components”, which will provide them with some advantage in selling their products to builders. While the performance indication system is voluntary, it is expected that once the Performance Indication Standards have been published, prospective homebuyers will begin to insist that builders show how their homes compare to the performance standards. If this happens comparison of performance standards may become an informal requirement of the marketplace. There are potentially negative ramifications of the Performance Indication Standards for foreign manufacturers, however. Since domestic manufacturers have an advantage over foreign manufacturers in gaining recognition as “Authorized Manufacturers of Performance Components”, the system has the potential to exclude foreign manufacturers and their products from a growing segment of the market.

Finally, the HQAA includes a provision for a Completion Guarantee System to protect homebuyers against default by, or the bankruptcy of, their contractor before the home is completed. Framers of the HQAA included this provision for two reasons. It is typical in Japan for the homebuyer to provide financing to the contractor up front. For example, it is not unusual for the homebuyer to pay the contractor one-third of the price of the home before construction begins, with an additional third due after the house has been framed in, and the remaining funds due upon completion of the house. This system may have worked well in the past but, given the current economic recession in Japan, a number of contractors have recently gone bankrupt, leaving homebuyers with partially completed homes and outstanding payments due on building materials. The aim of the Completion Guarantee System is to provide homebuyers with a form of insurance so that, in the event their builder goes bankrupt, funds will be available to complete the construction of their house.

To date, two organizations issue completion assurance guarantees. The first organization, Jutaku Anshin Assurance Company, is a privately funded effort between 52 national building material retailers (each of whom contributed ¥5 million) with substantial support from a consortium of four major Japanese insurance companies. The second organization, known as the Organization for Housing Warranty, is publicly funded.

For a homebuilder to become a member of either of these organizations, they must submit a financial statement of their company for examination. Builders that are judged to be financially unstable are unable to join either organization and therefore, they cannot offer completion guarantees. Analysts estimate that there are approximately 160,000 contractors in Japan. Less than 50,000 of these companies build more than ten homes per year and the remaining contractors tend to be very small firms who build less than 5 homes per year. Given this industry structure, it is widely expected that many of these small firms will not have the financial resources to join one of the Completion Assurance organizations. Obviously, this will place these builders in an extremely weak position when they try to establish contracts with new customers. In fact, there is strong speculation that any new home construction being financed with a GHLC mortgage will be required to have a completion assurance guarantee issued prior to signing the construction contract.

This system of providing homebuyers with completion assurance guarantees, particularly from the privately funded Jutaku Anshin Assurance Company, has significant implications for manufacturers and exporters of wooden building materials. Jutaku Anshin will probably focus on recruiting the larger, more financially stable, builders. To the extent that this relationship encourages member builders to purchase their building materials through member building material retailers, while discouraging relationships with non-member retailers or direct purchases from US manufacturers and consolidators, it could effectively restrict market access for US firms. The direct relationship between Japanese builders and US manufacturers and consolidators, which in the past had become an increasingly important distribution channel, could be phased out in favor of keiretsu-like relationships within the assurance group.

Implications for Material Specification in Residential Construction

The reduced demand for Canadian softwood lumber can be partly attributed to the economic recession in Japan, yet it is not the only, or even the most important, factor. Perhaps a more significant factor has been a structural change within the residential construction industry where builders and precut housing manufacturers prefer kiln dried softwood lumber. While the Canadian and US softwood lumber industries were slow to recognize this shift in market preference, softwood lumber manufacturers in Europe (particularly Finland, Sweden, and Austria) were well positioned to capitalize on the changing market preference. European exports of kiln-dried lumber increased from less than 5,000 cubic meters in 1993 to over 2 million cubic meters in 1999. In reviewing the trade data, it is apparent that the success of European softwood lumber came largely at the expense of US, and to some extent Canadian, unseasoned hemlock lumber. Since 1989, the US share of the Japanese softwood lumber market has declined from 48.3% to 10.7% while the European market share has increased from 0% to 16.4% and the Canadian market share has increased from 50.9% to 59%.

The factors that have caused this strategic change in the residential construction industry are: 1) the aging and declining number of carpenters in Japan and 2) an effort to increase the quality of the new homes being built. In response to the decline in the number of carpenters in Japan, residential contractors have substantially increased their use of precut post and beam housing kits. In the past, skilled carpenters cut all the joints and notches for the traditional post and beam house on the job site. While they frequently used green lumber to build the house, this was not too much of a problem because the components were fit together as soon as the joints were cut and the lengthy construction period required to build this type of house provided an adequate period for the green lumber to air dry with minimal drying defects. However, as the number of skilled carpenters continued to decline, many builders began to opt for precut house packages where the notches and joints of the structural components are precut to very exacting tolerances in a factory. Because of the high tolerances required for the joints to fit tightly together when the house is built, virtually all precut manufacturers utilize kiln dried lumber to manufacture their components. In fact, a great majority of them use kiln dried glue-laminated lumber in place of solid sawn lumber in their manufacturing processes. In 1999, the number of precut wood frame houses built in Japan exceeded 200,000.

As the demand for kiln dried glue-laminated lumber by precut housing manufacturers increased, the Japanese glue-laminated lumber industry struggled to increase their production capacity. Recognizing an opportunity to quickly penetrate the Japanese market, European softwood lumber exporters were quick to supply kiln-dried lamstock to Japanese glue laminated lumber manufacturers. By providing a high quality, competitively priced product, the Europeans have rapidly increased their share of the Japanese softwood lumber market. In fact, as the increasing production capacity of the glue laminated lumber industry began to exceed the demand for glue-laminated lumber from the precut housing industry, glue-laminated lumber producers began to promote their products to traditional post and beam builders as a dimensionally stable substitute for green lumber.

Not only have the Europeans been willing to provide the Japanese with kiln-dried lumber, but there is a widespread perception in Japan that the quality of European whitewood lamstock is superior to North American hemlock and SPF lumber. Furthermore, Europeans suppliers have been much more willing to meet the specific needs of their Japanese customers than the Americans or even the Canadians. For example, a number of Japanese lumber importers have said that their European suppliers are willing to provide full shipments of specific length lumber while their Canadian suppliers often require them to purchase a mix of lengths rather than the specific length they are looking for. Perhaps this difference between the Europeans and Canadians can be attributed to the fact that European lumber manufacturers export to a broad range of markets, all of which have different product specifications. Thus they have learned to be responsive to each customers' product requirements and they have learned how to incorporate a broad mix of products into their manufacturing process. This is a lesson that North American lumber exporters are going to have to adopt if they expect to remain competitive in the Japanese market.

The effort to increase the use of glue-laminated lumber in traditional post and beam housing was greatly advanced when the Japanese government began a campaign to increase the quality of new residential houses being built. The government's campaign to increase the quality of new homes in Japan culminated in the adoption of the Housing Quality Assurance Law (HQAL) in April 2000. Since the HQAL was adopted industry observers expect the demand for green softwood lumber will continue to decline as builders increasingly substitute kiln dried lumber for unseasoned lumber.

As Canadian manufacturers and exporters of wood products struggle to adjust to changes in the competitive environment in Japan, they are confronted with two regulatory changes that directly affect the types of softwood lumber used in the Japanese residential construction industry. The revised Building Standard Law of Japan and the newly implemented Housing Quality Assurance Law will significantly impact the structure of the residential construction industry in Japan, the mix of products that builders will specify, and the range of services that they will request from suppliers in the future.

PROJECT OBJECTIVES

The objectives of this study are to analyze the Japanese domestic forestry sector, the Japanese domestic wood processing industries, and Japanese government subsidies, payments or other programs that benefit these industries. This study also explores the impact of both tariff protection and full tariff elimination on the Japanese forest sector, Japanese wood product manufacturers and consumers. Finally, this study identifies and investigates the role subsidies play in the forestry sector and evaluates their impact on the health, management, and production of forest products from Japanese forests. The specific objectives of this study are to: 1) conduct an analysis of the current situation of the Japanese domestic forests, 2) conduct an analysis of Japanese domestic wood processing industries, and 3) conduct an analysis of the Japanese domestic subsidy program for the wood processing and forestry sectors.

CHAPTER 2. FORESTRY INDUSTRY

FOREST RESOURCE

Contrary to most people's impression, Japan is a richly forested country with forests covering more than two-thirds of its land area (Table 2-1). This ratio of forest cover is consistent across Japan, with the exception of the Kanto region (with the heavily industrial prefectures of Tokyo, Chiba, and Kanagawa) in eastern Japan. Forest cover ranges from 74.5% of the land area in rural Chubu and Shikoku regions to just 44.5% in the heavily industrialized Kanto region. The majority of the forest resource in Japan lies in the northern and western regions of the country, with 22.4% of the forest area located on the island of Hokkaido, 18.6% in the Tohoku region, and 18.3% in the Chubu region (see Appendix A for regional maps of Japan).

Forest Ownership

Almost 60% of the forests in Japan are privately owned, 31% are owned by the national government, and other public groups own 11% (Table 2-2). Other public bodies that own forest areas are primarily prefectural bodies (38.3%) and municipal bodies (39.2%). Private forests are dispersed among a large number of small plots with over 2.5 million owners. The average size of a forest holding is just under 10 hectares per forest owner, although this statistic seriously overstates the size of the typical forest holding. A breakdown of forest owners by size of forest holding shows that approximately 58% of private forests are less than one hectare in size and an additional 31% are less than five hectares (Table 2-3). More importantly, barely one percent of forest owners in Japan have forest holdings that exceed 30 hectares. From 1970-1990, the forestry statistics show that there has been a trend towards smaller forest holdings as forests that are 1 to 10 hectares have generally been converted to smaller forests of less than one hectare (Table 2-3). This ownership pattern has clear implication on the ability of private forest owners to economically manage their forests for timber production. It also restricts the ability of forest owners to access the capital required to actively manage their forests and improve the quality of their timber.

By area, the largest forest areas are located in the Hokkaido, Tohoku, and Chubu regions. The largest private forest areas are located in Chubu, Tohoku, Kinki, and Chugoku regions. As a percentage of forest ownership, public forest ownership is highest on the island of Hokkaido (71.1%) and lowest in the Shikoku (23.4%), Chugoku (22.6%) and the Kinki (17.4%) regions.

The volume of growing stock in Japan's forests totals 3.48 billion cubic meters, two-thirds of which, is comprised of softwood species. As might be expected, the majority of the growing stock (63.5%) is located in private forests, although private forests represent 58% of the forest area. In contrast, national forests contain only 26.2% of the growing stock, while they represent 31.2% of the total forest area.

Forest type and Stocking Volumes

Over half of the forests in Japan (53.2%) are classified as natural forests, and the remainder are artificial (plantation) forests (Table 2-2). The majority of the National Forests are natural (60.4%) while private and other public forests are more evenly distributed between natural and plantation forests.

Table 2-1. Forest area and Forest Households, by Region.

Region	Total Area (hectares)	Percent Forested	Forest Area (hectares) Total	Total (%)	Private	Private (%)	Forest Households (number)	Average Forest Size (ha)
Total	36,684,500	68.2%	25,026,282	100.0%	14,004,553	100.0%	2,508,605	9.98
Hokkaido	8,345,200	67.1%	5,597,221	22.4%	1,613,290	11.5%	72,957	76.72
Tohoku	6,398,300	72.8%	4,655,386	18.6%	2,129,330	15.2%	369,169	12.61
Kanto	3,214,600	44.5%	1,430,042	5.7%	900,506	6.4%	335,381	4.26
Chubu	6,156,800	74.5%	4,587,445	18.3%	2,794,974	20.0%	473,821	9.68
Kinki	3,293,000	67.2%	2,211,694	8.8%	1,822,845	13.0%	299,657	7.38
Chugoku	3,180,900	73.7%	2,343,988	9.4%	1,814,243	13.0%	352,545	6.65
Shikoku	1,878,800	74.5%	1,399,175	5.6%	1,071,172	7.6%	158,896	8.81
Kyusu-Okinawa	4,216,600	66.4%	2,801,331	11.2%	1,858,193	13.3%	446,179	6.28

Source: *75th Statistical Yearbook of MAFF, 2001.*

Table 2-2. Forest Resources in Japan, 1995.

	Total				Artificial Forests				Natural Forests				Other Area
		Growing Stock				Growing Stock				Growing Stock			
	Area	Total	Softwood	Hardwood	Area	Total	Softwood	Hardwood	Area	Total	Softwood	Hardwood	
Total	25,146	3,483	2,310	1,173	10,398	1,892	1,864	28	13,382	1,590	446	1,144	1,366
Forestland													
Nat'l Forest	7,844	912	479	433	2,446	292	274	18	4,738	619	204	415	660
Public Forest	2,730	359	236	123	1,209	199	197	2	1,433	160	39	121	88
Prefectural	1,196	149	91	58	477	71	70	1	703	78	21	57	16
Other	1,534	210	145	65	732	128	127	1	730	82	18	64	72
Private	14,572	2,212	1,596	616	6,743	1,401	1,393	8	7,211	811	203	608	618

(Growing stock: million cubic meters) (Area: 1,000 hectare)
Source: *Forestry Statistics (Ringyo Tokei Yoran) 1999. Forestry Agency.*

Table 2-3. Number of Forestry Households by Size of Forest Holding, 1970-1990.

Year	Total	No. of Households < 1 ha.	1 ~ 5 ha.	5 ~ 10 ha.	10 ~ 20 ha.	20 ~ 30 ha.	30 ~ 50 ha.	50 ~ 100 ha.	> 100 ha.
1970	2,565,859	1,421,397	852,621	161,835	81,902	23,357	14,411	7,151	3,185
1980	2,531,261	1,418,690	823,192	157,228	82,093	24,156	15,044	7,378	3,480
1990	2,508,605	1,452,255	777,207	150,661	79,281	23,294	14,664	7,490	3,753

Source: *75th Statistical Yearbook of MAFF, 2001.*

Japan's growing stock is approximately two-thirds softwood species and one-third hardwood species. While the National Forests display a more balanced level of stocking between hardwood and softwood species, other publicly owned forests and private forests are heavily skewed towards softwood species. This is due to a combination of factors, including the fact that 76.5% of the area of plantation forest ownership is private or "other public", the stocking volumes in natural forests (119 m3 per hectare) are substantially lower than in plantation forests (181 m3 per hectare), and the species distribution in plantation forests is almost entirely softwoods (99.4%).

By 1999, approximately 8.8 million hectares of primarily publicly owned forests had been designated as protection forests. The dominant type of protection forests are headwater conservation forests (72%) followed by soil loss prevention forests (23.7%). The total area of protection forest represents approximately 35.2% of all forest area in Japan.

Forest age and Species Distribution

The age class distribution for private and National Forests is presented in Figure 2-1. Unfortunately, age class information is not available for other publicly owned forests. The available data does however clearly show a bimodal distribution for the total forest resource, with peaks at 31 to 40 years of age and at 81+ years of age. Over half of the total forest area is less than 40 years of age (53.5%) while an additional 16.4% is over 80 years of age. However, the age class distribution for private forests is substantially different from that of the National Forests. Almost two-thirds of the private forest resource (65.1%) is between 21 and 50 years of age (totaling 10.78 million hectares) while over half of the National Forest resource (54.7%) is in excess of 71 years in age (totaling 3.85 million hectares).

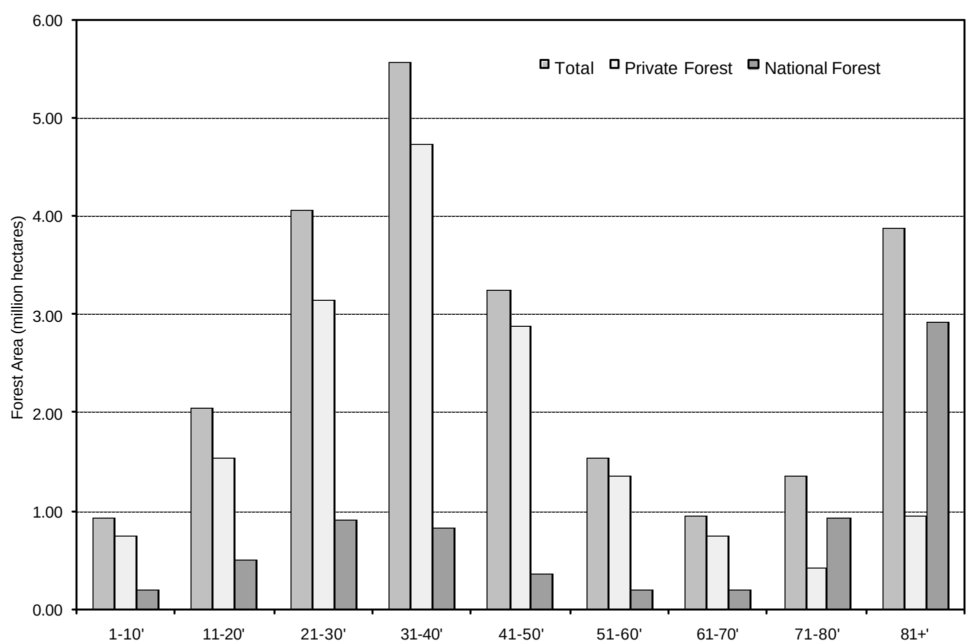


Figure 2-1. Age Class Distribution of Forests in Japan, by Ownership.

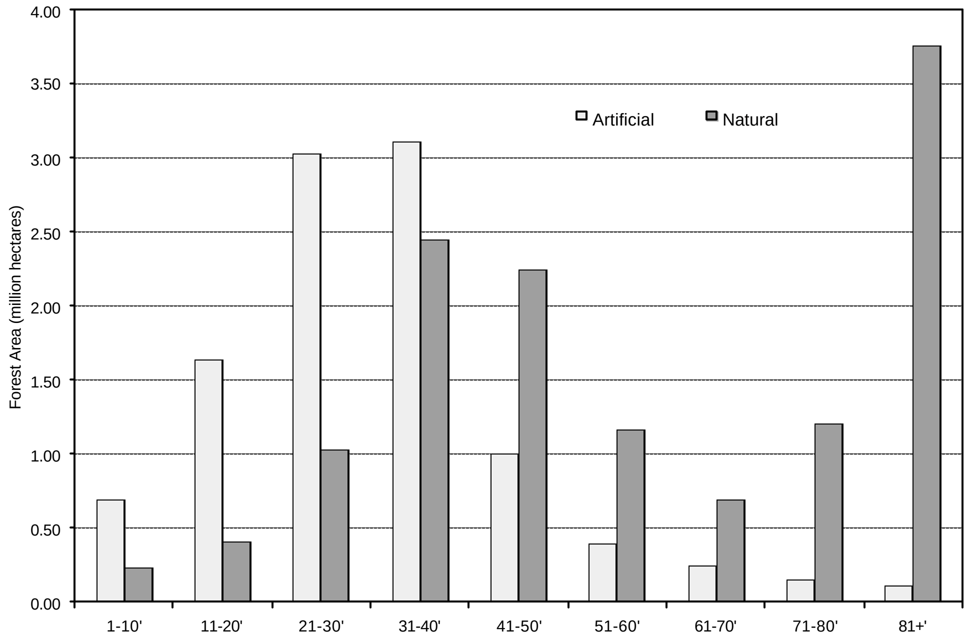


Figure 2-2. Age Class Distribution for Natural and Plantation Forests in Japan.

Since the majority of the National Forest area has been set aside for protection, we would expect to see a distribution skewed towards the older age classes. The bulk of the private forest resource, which is more actively managed for timber production, is clustered in the 21 to 50 year age classes. Given a forty to sixty year rotation for the major softwood species in Japan, it is obvious that there is already a large volume of timber becoming available for harvest in the private forests.

Another way of analyzing the age class distribution of forests in Japan is plantation versus natural (Figure 2-2). This type of classification shows that 59.2% of plantation forests are between 21 years and 40 years of age (6.14 million hectares). It also shows that the age class distribution in natural forests is bimodal, with 35.6% of natural forests between 31 and 50 years of age (4.70 million hectares) and 37.6 % over 71 years of age (4.97 million hectares).

The data presented in Table 2-2 shows that softwood species are the predominant species established in plantation forests. The two primary commercial softwood species grown in Japan are sugi (Japanese cedar) and hinoki (Japanese cypress). The age class distribution of Japanese forests, by the major species, is presented in Figure 2-3. The age class data clearly shows that sugi is the dominant species in Japan, planted on 4.54 million hectares compared to 2.53 million hectares of hinoki and 3.31 million hectares of other species (notably pine and larch). However, it is interesting to note that while sugi is the dominant species in the 26 to 60 year age classes, the area planted in sugi and hinoki over the past twenty years has been roughly equivalent. This would suggest that there has been a fundamental shift in the timber market over the past twenty years that has changed the relationship between these species.

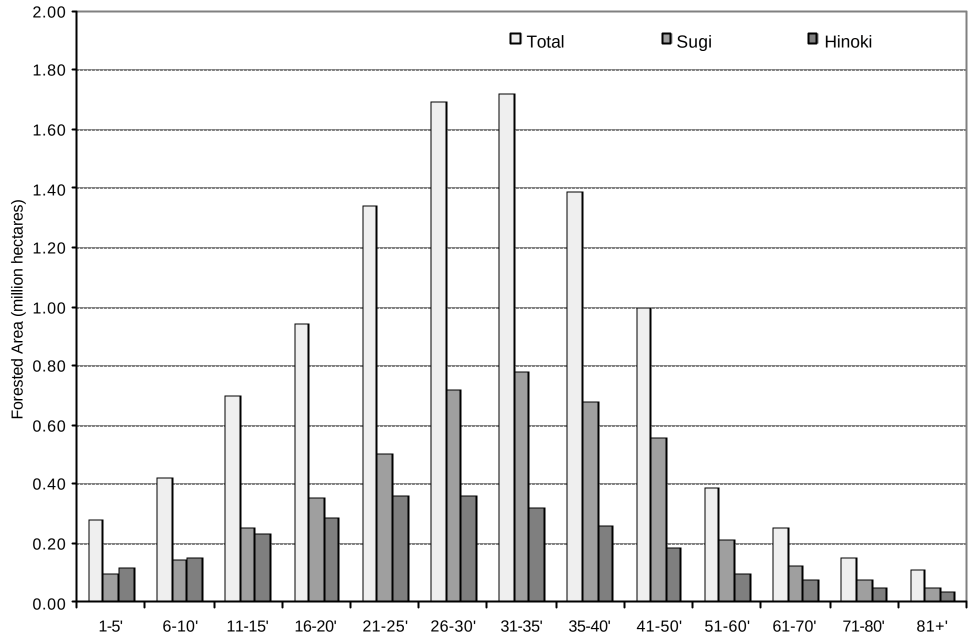


Figure 2-3. Age Class Distribution of Japanese Forests, by Major Species.

Reforestation

Since the end of the Second World War the Japanese have replanted over 12 million hectares of forest (Figures 2-4 and 2-5). The majority of the reforested area is on private and other public lands, although a substantial amount of reforestation occurs within the National Forests (Figure 2-4). From 1950-1970, the area of land that was reforested was relatively constant, typically exceeded 300,000 hectares annually. In contrast, the area of land reforested during the period 1971-1998 has been steadily declining from approximately 350,000 hectares in 1971 to less than 50,000 hectares in 1998.

The timber species planted during this period is summarized in Figure 2-5. This data clearly shows that *hinoki* and *sugi* have been the predominant species planted in Japan. The data also shows a trend away from planting other species (in particular pine and larch) since the early 1970s. From 1950-1970, pine and larch represented a substantial percentage of the area reforested in Japan. In fact, during the early 1950s, the area planted in pine was almost equal to the area planted with *sugi*, while throughout much of the late 1950s and 1960s the area planted in *hinoki*, pine and larch was approximately equivalent. By the early 1980s, however, the majority of the area reforested in Japan was in either *sugi* or *hinoki*.

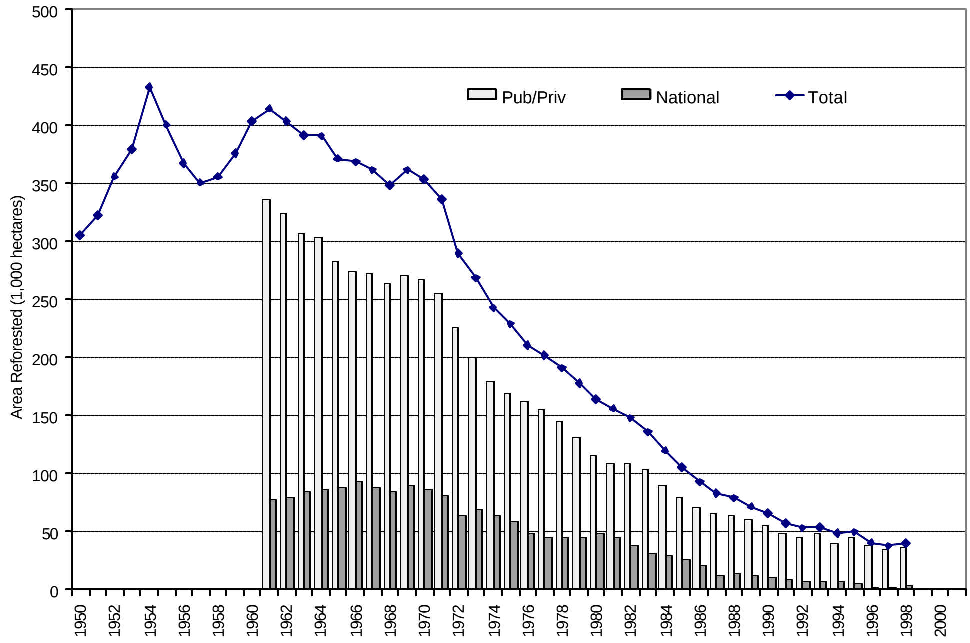


Figure 2-4. Annual Area Reforested in Japan, 1950-1998.

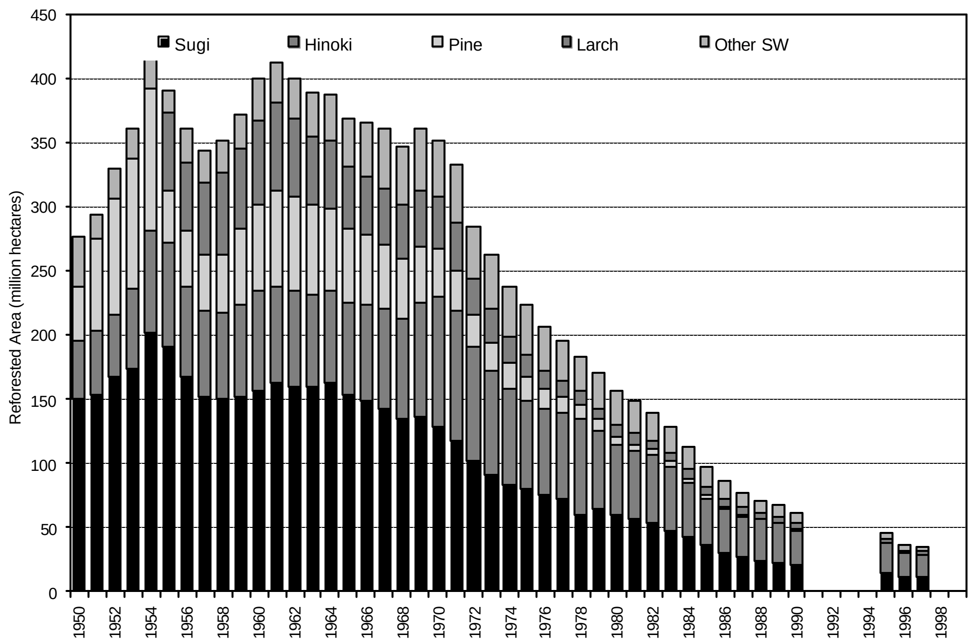


Figure 2-5. Annual Area Reforested in Japan, by Type of Species Planted.

TIMBER HARVEST

Harvest by Ownership

Timber harvests in Japan have been generally declining over the period 1960-2000 (Figure 2-6). The majority of timber harvests have been on private forests, although the prefectural and municipal forests play a substantial role in the timber supply. In contrast, National Forests have traditionally supplied less than 10% of the timber harvest. From 1960-1973, the timber harvest from prefectural and municipal forests remained fairly constant while private harvests declined sharply. From 1973-1991, there was a reversal in this trend and harvests on private harvests leveled off while prefectural and municipal timber harvests began to decline. Finally, during the 1990s there has been a substantial decline in the volume of timber harvested in Japan from all forests.

From 1952-1974, the percentage of hardwoods in Japan's timber harvests increased from 12.8% to 43.6% of the total logs harvested (Figure 2.7). In contrast, the softwoods harvested during this period declined substantially. After 1975 the volume of softwood logs harvested stabilized at approximately 20 million cubic meters, while the volume of hardwood logs harvested declined from 17 million cubic meters in 1974 to just 4 million cubic meters in 1998.

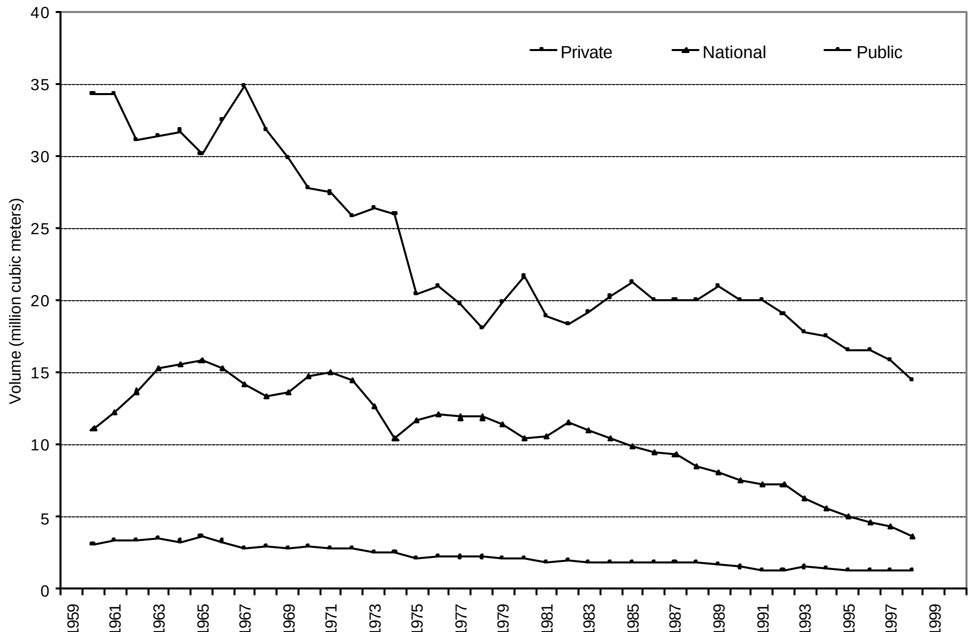


Figure 2-6. Total Harvest Volume, by Forest Ownership.

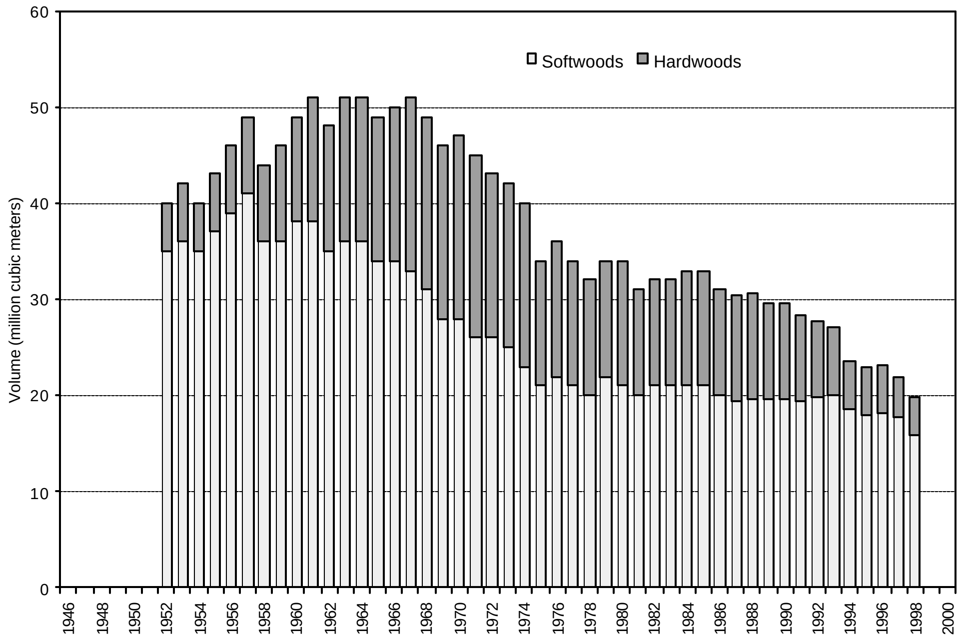


Figure 2-7. Total Harvest Volume, Softwood vs. Hardwoods.

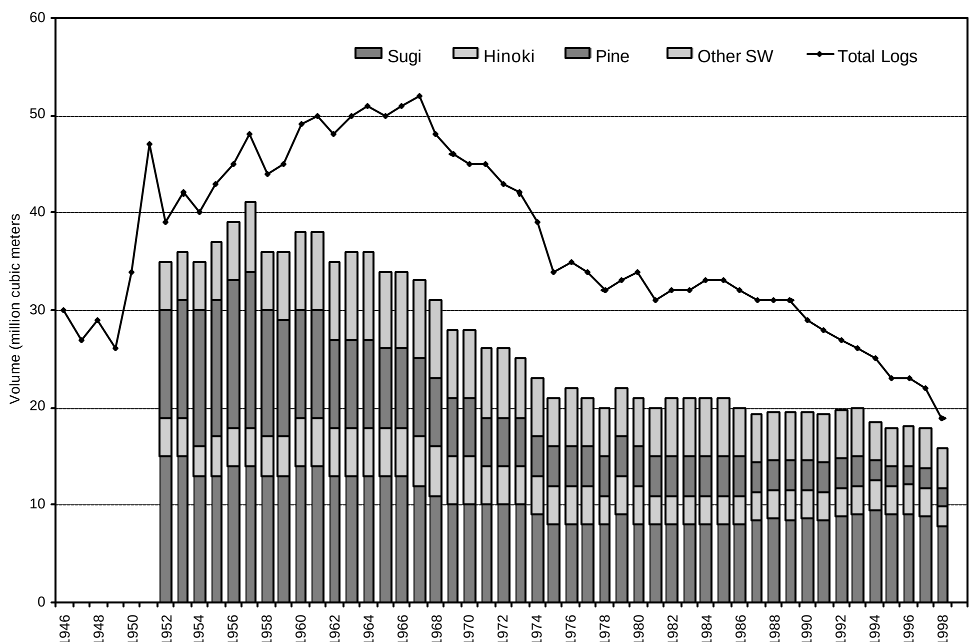


Figure 2-8. Total Harvest Volume in Japan, by Species.

Harvest by Species

At the species level, there have been two important changes in the mix of logs harvested (Figure 2-8). First, as described above, the volume of hardwood logs harvested has declined significantly since the mid 1970s. Unfortunately, there is no species specific data collected for the hardwood harvest in Japan. Second, the volume of pine harvested in Japan has also declined significantly from 1952-1998. During this period, the volume of pine logs harvested declined from 11 million cubic meters (28.2% of the total log harvest) to 2 million cubic meters (10.5% of the total log harvest).

Log Distribution

Most logs that are harvested in Japan are sold by the forest owner or logging company directly to a local sawmill or they are sold to a regional log auction market (Figure 2-9). Over the past thirty years the volume of logs sold directly by the forest owner to a sawmill has declined from 46% to 29%. Over the same period, the volume of logs purchased from the log auction markets has increased from 22% to 42%. One of the main reasons for this trend is that the log auction market sorts the logs into more uniform lots (based on factors such as species, sizes, and grades) that better match the raw material requirements of the sawmills, thereby reducing their waste. Imported logs follow a much simpler channel of distribution (Figure 2-10). The majority are imported by a trading company which then sells them to either a domestic log distributor or directly to a sawmill. The domestic log distributor then sorts and grades the logs prior to selling them to the sawmill. A substantial percentage are sold directly to the larger sawmills by the foreign log seller. This channel has been increasing in importance over the past decade.

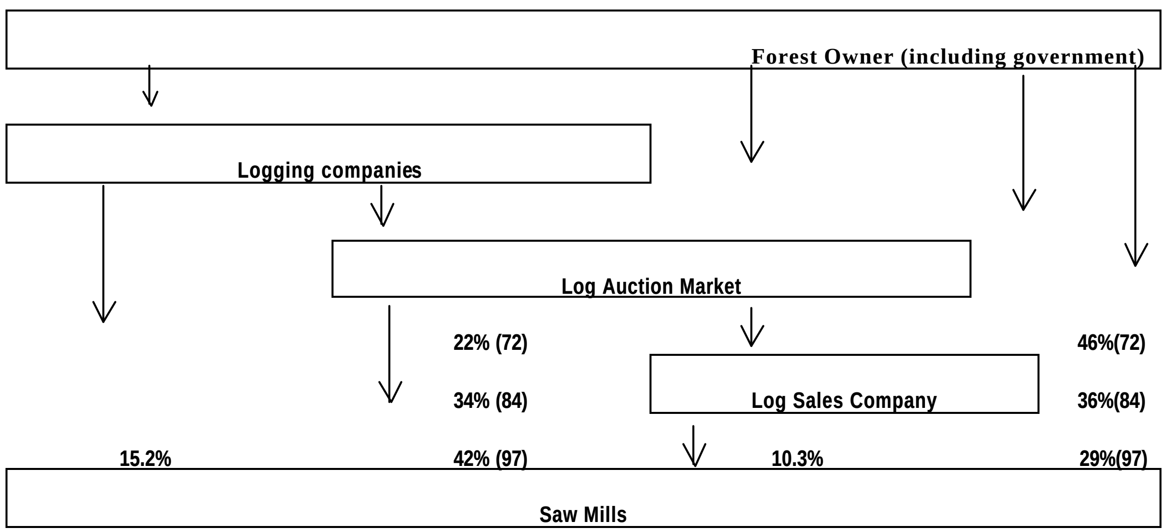


Figure 2-9. Typical Distribution Channels for Domestic Logs in Japan.
Source: Ministry of Agriculture, Forestry, and Fishery

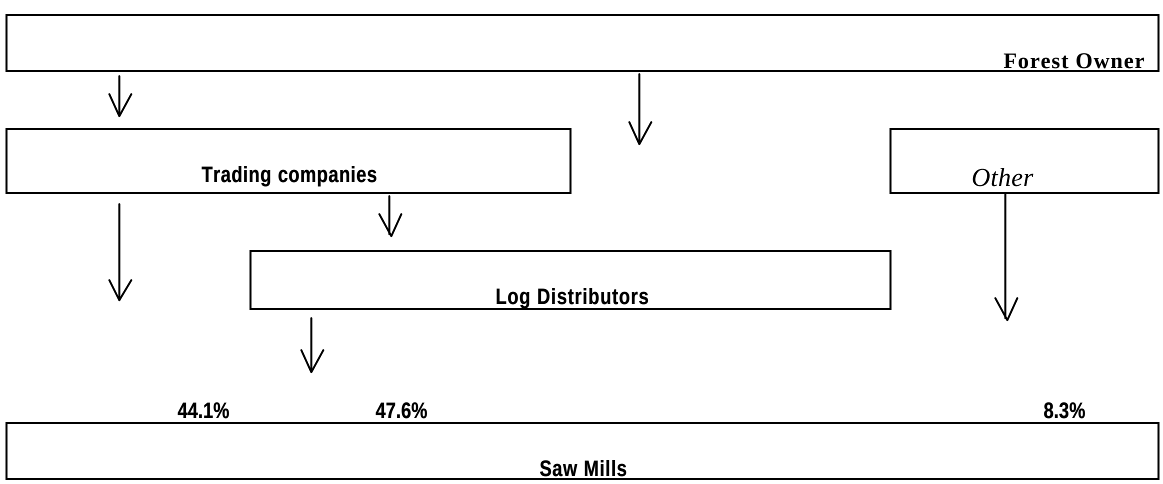


Figure 2-10. Typical Distribution Channels for Imported Logs in Japan.
Source: Ministry of Agriculture, Forestry, and Fishery

Stumpage Price Trends

The stumpage price data displays not only the price trends for the three major softwood species, it also highlights the fact that each of these species is differentiated in the marketplace (Figure 2-11). This differentiation is clearly illustrated by the fact that *hinoki* consistently receives a price premium relative to *sugi* and pine, particularly after 1965. In contrast, the price premium for *sugi* relative to pine is less than that for *hinoki*, indicating that *sugi* and pine are perceived to be somewhat similar by end-users although a higher value is clearly attached to *sugi* relative to pine.

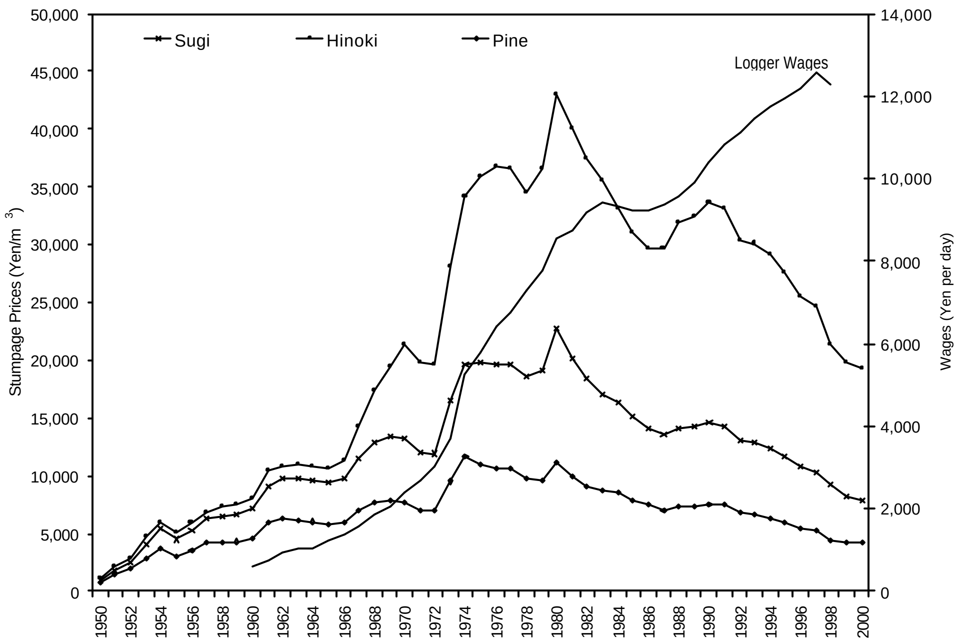


Figure 2-11. Forestry Labor Wages Relative to Stumpage Price Trends for the Major Softwood Species.

From 1950-1965, stumpage prices for the three major softwood species increased at an average annual rate of 52% for *sugi*, 53% for *hinoki*, and 38% for pine. From 1966-1980, stumpage prices for these species continued to rise at an annual rate of 8.8% for *sugi*, 18.7% for *hinoki* and 5.9% for pine. It was during this period that the price differential between *hinoki* and the other major species became significant. From 1950-1966, the price premium for *hinoki* relative to *sugi* had averaged 12.6%, yet from 1966-1980, the price premium for *hinoki* (relative to *sugi*) rose to as high as 92% and averaged a hefty 68.8%.

Finally, from 1981-2000, stumpage prices dropped significantly for all three of the major softwood species. The stumpage price declines ranged from an average annual price decline of 2.6% for *hinoki* to 2.9% for pine, and 3.1% for *sugi*. Despite these declines, the price differential for *hinoki* continued to rise reaching 148% in 2000. From 1981-2000, the price premium for *hinoki* averaged 124.7%, relative to *sugi*. Clearly, this is a major reason why more area has been reforested with *hinoki* than *sugi* since the early 1980s.

Labor Wages and Demographics

In contrast to stumpage prices, the logging wages have increased steadily since 1960. At the same time, there has been a significant demographic shift in the forestry industry (Figure 2-12). Not only has the number of workers in forestry declined from 440,000 in 1960 to less than 80,000 in 1999, the age structure of the workforce has changed dramatically. The most recent survey of forestry workers shows that 57% were over the age of 55 while less than 10% were under the age of 35. The combination of a declining and aging workforce and a rising wage structure has serious implications for the productivity and efficiency of the forestry industry.

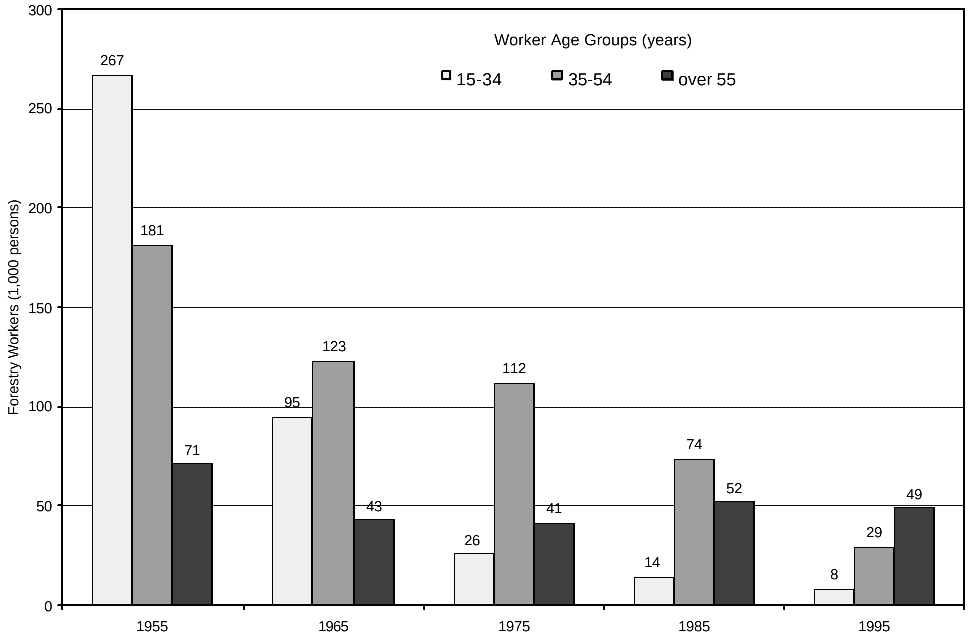


Figure 2-12. Demographic Trends for Forestry Workers in Japan.

SUMMARY OF FOREST INDUSTRY TRENDS

Japan's forest sector faces several physical and structural challenges, most of which adversely impact the competitiveness of the forestry sector in general and the small private forest owner in particular. One of the most basic obstacles is Japan's geography. Many forests are located in steep terrain, which makes forest management challenging and increases the costs of building roads, harvesting, and transporting the logs from the forest. These high costs are further exacerbated by the fact that the majority of private forests are very small, which makes it difficult for the owners to raise capital and harvest their forests. At the same time emigration from rural to urban areas reduces the number of available workers. The workers who remain are aging and few younger workers are drawn to the hard and dangerous labor involved with forestry, despite the fact that wages for forestry work are increasing.

Meanwhile, on the demand side, stumpage prices for the major domestic species (*sugi*, *hinoki*, and pine) have been declining precipitously since 1980. Caught between rising costs of production and declining prices, many forestry households are finding it more and more difficult to continue in business. This point is aptly illustrated by a set of financial statistics published by the Forestry Agency in Japan. Based on a time series of production cost and stumpage price data, the Forestry Agency has calculated the internal rate of return derived from an investment in a *sugi* plantation. Using their own methodology, the Forestry Agency estimates that the internal rate of return from a *sugi* plantation has declined from 6.3% in 1965 to 4.1% in 1975 to 2.1% in 1985 to 0.9% in 1993 (the most current year for which this data is available). Their results clearly show that it is becoming virtually impossible to manage a forest plantation as a viable economic enterprise.

This situation is summarized very succinctly in a passage from a recent book on the historical growth and recent performance of Asian economies[1]. Discussing the business ethic and factors influencing competitiveness in rural Japan, author Nicholas Kristoff emphasizes the relationship between business practices and culture that impacts the ability of small forest owners to maintain their profitability.

1 Kristoff, N.D. and S. WuDunn, 2000. Thunder From the East. Alfred A. Knopf Publishers, New York. 377 pages.

> The paramount concern was not prices or cost but *giri-ninjo*, an ancient Japanese ethic that translates roughly as "duty and empathy". The result throughout Japan…was an economy whose outward façade was skyscrapers and business suits but whose human interactions were still rooted in traditional concepts of honor. And the collision of the international market economy with rural Japan's *giri-ninjo* economy was not a pretty sight. Americans may think of Japanese businessmen as ruthless, calculating tigers, but this is true only in sectors that compete abroad. Domestic companies are the opposite. (pp:84)

In specifically relating this philosophy to the situation of small forest owners, Kristoff points out that most small forest owners employ an economic principle that does not necessarily aim to maximize profits, but rather takes into account community welfare considerations. This point is highlighted during a discussion with a local forest owner in Mie prefecture.

> The problem is the same as that faced by many sectors of the Japanese economy: A long-sheltered business was exposed to international competition and battered by it. Businesses that had thrived under protectionism faced [international] companies that had been forged in the furnace of free markets…Throughout the 1990s logs and finished wood began to pour into Japan at prices [rural forest owners] could never compete with, and 80 percent of Japan's lumber is now imported. "My break-even cost of selling a log in Tokyo is higher than the price of an American log in Tokyo," Zenzaburo complained.
>
> The underlying difficulty…was that business was not run according to market economy principles. [Rural forest owners] are not profit-maximizers. They pay their employees above market wages and hire more workers than they should. They produce high quality timber that they can feel proud of, they build roads and provide land for schools and buttress the economy, but while all this is admirable, it makes them economically inefficient as timber producers. (pp:83)

Given the high cost of forestry in Japan relative to other supply regions of the world, it is time to reassess the future role of the forestry sector in Japan. Given the comparative disadvantage that Japan faces in the production of timber, it may be time to focus on the environmental role of the forests, rather than the role of the forest as a raw material supply.

CHAPTER 3. SOFTWOOD LUMBER INDUSTRY

BACKGROUND

The lumber industry in Japan has traditionally been characterized by small-scale "mom and pop" sawmills operating within a very localized, rural, market. These mills typically process locally produced logs into lumber for use by local home builders. Most of their lumber is sold to local wholesalers who perform many of the marketing functions for the sawmill. As a result, many small sawmills have a poor understanding of the markets and demand for their products. Increasing competition from imported lumber has contributed to the problems confronting local sawmills, as has the closure of a large number of small rural sawmills over the past twenty years. These small rural sawmills were often family run and the continued movement of population from the rural areas to the big cities has left many of these small sawmills to close when the owner retires.

Large sawmills located in the industrial zones of large cities have replaced small rural sawmills. These larger sawmills often process a combination of imported logs and domestic logs, although some of the largest sawmills process imported logs exclusively. These mills are larger, more efficient, with more modern equipment and better access to capital than are the small local mills. However, these mills are also confronted with the rising cost of production that have plagued the small rural mills and they often find themselves at a competitive disadvantage with foreign lumber producers.

SOFTWOOD LUMBER INDUSTRY DEMOGRAPHICS

Number of Sawmills by Region

The number of sawmills in Japan has been declining steadily since 1963, while lumber production has been declining since 1973 (Figure 3-1). The number of sawmills in Japan, which totaled 25,295 in 1963, fell to just 11,692 in 2000. As a consequence, lumber production has declined from a high of 45.3 million cubic meters in 1973 to 17.2 million cubic meters in 2000. It is interesting to note that while the number of sawmills declined 51.3% since 1973, the decline in lumber production over the same time period has been a much higher 62%. Clearly, mills closures are not limited to just the small, rural "mom and pop" sawmills.

Number of Sawmill Workers by Region

The number of sawmills in 2000 totaled 11,692, a decline of 16.4% from 1996. Meanwhile, the number of employees in the sawmill industry fell to 73,625, a decline of 26% (Table 3-1). Similarly, lumber production declined 28.8% from 1996 to 2000. *(The relevant sawmill statistics for each prefecture can be found in Appendix B)*. Although the greatest percentage of sawmill closures occurred on the island of Hokkaido, the data presented in Table 3-1 shows that there were mill closures occurred in every region of Japan. The decline in lumber production in each region ranged from a 17% decline in the Chugoku region to a 31.6% decline in the Kinki region. However, it should be noted that not all of the drop in lumber production is attributed to mill closures. Rather, some of the drop in production can be attributed to curtailed production levels due to reduced demand in the housing sector as a result of the prolonged economic slump in Japan. In addition, production decreases can also be attributed to foreign competition and increased lumber imports.

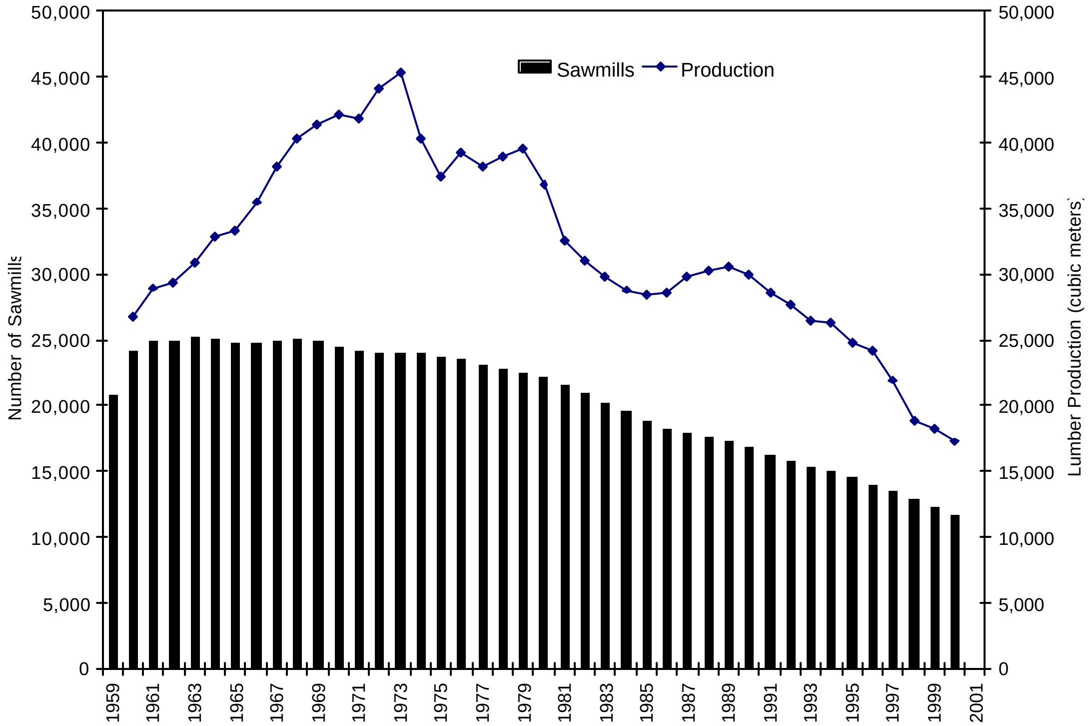


Figure 3-1. Number of Sawmills and Lumber Production in Japan, 1959-2000.

Table 3-1. Number of Sawmills, Employees, and Lumber Production (m^3) in Japan, by region.

Region	1996			1999		
	Sawmills	Employees	Production	Sawmills	Employees	Production
Total	13,990	99,464	24,206,000	12,247	78,757	18,165,000
Hokkaido	482	7,149	2,115,000	388	5,346	1,615,000
Tohoku	2,014	15,467	3,778,000	1,776	12,093	2,757,000
Kanto	1,694	8,929	1,552,000	1,464	7,125	1,130,000
Chubu	3,784	22,779	4,773,000	3,294	17,987	3,466,000
Kinki	2,234	14,167	3,075,000	2,006	11,408	2,102,000
Chugoku	1,044	8,831	2,894,000	910	7,077	2,402,000
Shikoku	827	7,139	2,481,000	713	5,670	1,829,000
Kyusu-Okinawa	1,911	15,003	3,538,000	1,696	12,051	2,864,000

Table 3-2. Sawmill Productivity in Japan (1996 vs 1999), by Region.

Region	1996			1999		
	Employees per Mill	**Production per Mill** *(1,000 m^3)*	**Production Per Employee** *(1,000 m^3)*	**Employees/ Mill**	**Production per Mill** *(1,000 m^3)*	**Production per Employee** *(1,000 m^3)*
Total	7.11	1730.24	243.36	6.43	1483.22	230.65
Hokkaido	14.83	4387.97	295.85	13.78	4162.37	302.10
Tohoku	7.69	1805.48	235.56	6.83	1511.23	222.33
Kanto	5.22	866.21	159.42	4.70	716.96	146.95
Chubu	6.13	1417.34	214.95	5.60	1210.09	197.28
Kinki	6.68	1414.68	206.99	6.03	1083.38	176.93
Chugoku	8.30	2479.79	280.54	7.62	2365.52	282.90
Shikoku	8.70	2766.40	323.73	7.99	2356.16	298.30
Kyusu-Okinawa	7.91	1600.79	199.87	7.02	1422.72	196.84

Sawmill Productivity by Region

Several productivity measures are presented in Table 3-2, although the reader should keep in mind that these numbers are averages. Given the wide variation in sawmill size in Japan and the ongoing economic problems, which have depressed lumber demand, it is perhaps better to focus attention on the lumber production per employee data. Based on this data, it would appear that the more productive sawmills are located on the island of Hokkaido and in the Chugoku and Shikoku regions. In contrast, sawmills with the lowest productivity appear to be in the Kanto and Kinki regions. The data also suggest that the number of workers and the average lumber production of sawmills in every region has declined since 1996. In addition, in many regions sawmill productivity (measured in terms of production per employee) has also declined although the reverse is true for Hokkaido and Chugoku.

Number of Sawmills and Production by Log Source

As described previously, many sawmills in Japan utilized a combination of domestic and imported logs in their raw material mix (Tables 3-3 and 3-5). In 1999, 5,568 sawmills (45.5% of total sawmills) processed only domestic logs while an additional 2,246 sawmills (18.3%) relied on domestic logs for more than 50% of their raw material inputs. In contrast, 1,711 sawmills (14% of the total) processed only imported logs while an additional 2,715 sawmills (22.2% of total) processed primarily imported logs. This suggests that a majority of the sawmills in Japan (63.8%) are primarily or exclusively processing domestic logs.

However, when considering the volume of log inputs that are processed within each category of sawmill, a different story emerges. The total volume of logs processed by mills utilizing only domestic logs was 9.82 million m^3, corresponding to an average annual processing capacity of 1,763 m^3 for this type of sawmill. In contrast, the total log inputs for mills processing only imported logs was 10.21 million m^3, corresponding to an average annual processing capacity of 5,970 m^3 for these sawmills. This suggests that the average imported sawmill is more than three times as big as the average domestic sawmill. In between these extremes are the mills that process primarily domestic logs and those that primarily process imported logs. The average annual processing capacity for these mills is 1,496 m^3 and 1,494 m^3, respectively, less than that of the domestic mills and suggesting that processing efficiency may increase when a mill specializes in a particular type of log.

Table 3-3. Summary of Softwood Sawmills in Japan (1996 vs 1999), by Region.

Region	1996						1999						
	Domestic Sawmills	Imported Sawmills	Dom. Lumber Production	Imp. Lumber Production	Prod./ Mill (Dom)	Prod./ Mill (Imp)	Region	Domestic Sawmills	Imported Sawmills	Dom. Lumber Production	Imp. Lumber Production	Prod./ Mill (Dom)	Prod./ Mill (Imp)
Total	11,856	8,075	10,926,000	13,280,000	922	1,645	Total	10,504	6,664	8,751,000	9,414,000	833	1,413
Hokkaido	440	294	1,403,000	712,000	3,189	2,422	Hokkaido	357	234	1,092,000	523,000	3,059	2,235
Tohoku	1,846	1,163	2,012,000	1,766,000	1,087	1,352	Tohoku	1,636	978	1,572,000	1,185,000	959	1,124
Kanto	1,456	836	857,000	695,000	513	854	Kanto	1,267	637	681,000	449,000	463	744
Chubu	2,974	2,898	1,212,000	3,561,000	361	1,371	Chubu	2,649	2,427	941,000	2,525,000	322	1,168
Kinki	1,811	1,321	1,155,000	1,920,000	547	1,500	Kinki	1,660	1,104	905,000	1,197,000	465	1,161
Chugoku	918	591	763,000	2,131,000	798	3,098	Chugoku	809	483	617,000	1,785,000	731	3,253
Shikoku	649	371	942,000	1,539,000	1,169	4,020	Shikoku	557	305	747,000	1,082,000	1,086	3,491
Kyusu-Okinawa	1,762	601	2,582,000	956,000	1,177	1,401	Kyusu-Okinawa	1,569	496	2,196,000	668,000	1,130	1,166

Table 3-4. Number of Sawmills in Japan, by Region and Number of Employees (1996 vs 1999).

	1996								1999							
Region	Sawmills	<4	5-9	10-19	20-29	30-49	50+	Region	Sawmills	<4	5-9	10-19	20-29	30-49	50+
Total	13,990	6,705	4,421	2,042	533	224	65	Total	12,247	6,533	3,602	1,543	368	151	50
Hokkaido	482	57	109	223	61	25	7	Hokkaido	388	54	108	154	49	17	6
Tohoku	2,014	870	672	323	102	40	7	Tohoku	1,776	887	548	248	60	27	6
Kanto	1,694	992	510	153	29	7	3	Kanto	1,464	941	377	116	22	6	2
Chubu	3,784	2,025	1,180	447	91	28	13	Chubu	3,294	1,931	943	332	61	17	10
Kinki	2,234	1,156	721	257	62	31	7	Kinki	2,006	1,131	615	195	38	25	2
Chugoku	1,044	470	320	163	51	31	9	Chugoku	910	464	260	119	37	21	9
Shikoku	827	297	281	189	34	18	8	Shikoku	713	285	244	142	21	16	5
Kyusu-Okinawa	1,911	838	628	287	103	44	11	Kyusu-Okinawa	1,696	840	507	237	80	22	10

Table 3-5. Log Input Volumes for Sawmills in Japan, by Region and Log Type (1996 vs 1999).

	1996 *(1,000 m3)*				1999 *(1,000 m3)*			
Prefecture	**Total**	**Domestic**	**Imported**	**US**	**Total**	**Domestic**	**Imported**	**US**
Total	35,545	16,154	19,391	12,799	27,449	13,246	14,203	8,458
Hokkaido	3,713	2,526	1,187	577	2,952	2,068	884	262
Tohoku	5,615	3,062	2,553	1,625	4,224	2,445	1,779	890
Kanto	2,166	1,223	943	740	1,591	978	613	447
Chubu	6,984	1,726	5,258	2,630	5,267	1,366	3,901	1,649
Kinki	4,420	1,647	2,773	2,111	3,097	1,331	1,766	1,263
Chugoku	4,337	1,102	3,235	2,666	3,677	897	2,780	2,296
Shikoku	3,369	1,308	2,061	1,460	2,550	1,050	1,500	1,043
Kyusu-Okinawa	4,941	3,560	1,381	990	4,091	3,111	980	608

Sawmills processing imported logs tend to have a higher level of average production, as the log input data suggests (Table 3-3). In 1999, the average annual lumber production for mills that process domestic logs was 833 m^3, yet it was 1,413 m^3 for mills that process imported logs. This is hardly surprising, given the fact that imported sawlogs, in general, have a larger diameter and are higher quality than domestic sawlogs. As a result, we would expect that sawmills processing imported sawlogs would be more efficient with a higher level of productivity. The highest share of imported logs are found in Chubu, Shikoku, and Kinki regions and the share of US logs in the imported log mix exceeds 50% in every region except Hokkaido (Table 3.6).

Number of Sawmills by Size

As discussed earlier, many of the sawmills in Japan are extremely small and inefficient "mom-and-pop" type operations. The data presented in Table 3-4 demonstrates this. Fully 53.3% of the sawmills employ four or less workers while an additional 29.4% employ between 5 and 9 workers. In contrast, less than 5% of all sawmills in Japan employ twenty or more workers. Clearly the sawmill industry in Japan continues to be characterized by the small "mom-and-pop" sawmills located primarily in rural areas and processing domestic *sugi* and *hinoki* logs for use by local builders.

Table 3.6. Ratio of Log Supply by Source (1996 vs 1999).

	1996			1999		
Prefecture	**Domestic Ratio**	**Imported Ratio**	**US Share of Imports**	**Domestic Ratio**	**Imported Ratio**	**US Share of Imports**
Total	0.45	0.55	0.66	0.48	0.52	0.60
Hokkaido	0.68	0.32	0.49	0.70	0.30	0.30
Tohoku	0.57	0.43	0.67	0.59	0.41	0.57
Kanto	0.49	0.51	0.80	0.52	0.48	0.76
Chubu	0.26	0.74	0.57	0.29	0.71	0.54
Kinki	0.32	0.68	0.71	0.37	0.63	0.68
Chugoku	0.40	0.60	0.75	0.42	0.58	0.74
Shikoku	0.32	0.68	0.66	0.34	0.66	0.64
Kyusu-Okinawa	0.61	0.39	0.64	0.65	0.35	0.52

Table 3-7. End-Uses for Domestically Produced Lumber (m^3), 1996 vs 1999.

	Total	Construction			Civil Eng.	Packaging	Industrial	Other
		Boards	Beams	Posts				
1996	24,206,000	3,547,000	7,293,000	8,747,000	922,000	2,275,000	710,000	712,000
1999	18,165,000	2,712,000	5,524,000	6,430,000	727,000	1,871,000	417,000	484,000

Lumber End-Use Applications

The primary end-use for lumber in Japan is the construction industry, primarily the residential construction sector (Table 3-7). In 1999, 81% of lumber was used in the construction industry. The primary end-uses are the posts (35.4%) and beams (30.4%) used to build post and beam homes. Other applications utilize the remaining 3.5 million m^3 of lumber, with the primary end-uses being packaging (53.5%) and civil engineering works (20.8%). While the total volume of lumber consumed has declined 25% since 1996, the distribution of lumber consumption within specific end-use applications has changed little.

The majority of domestic lumber is used in the construction industry (Table 3-8). This is true for lumber imported from North America and Northern Europe. In contrast, the majority of lumber imported from New Zealand is used for packaging material, while Southeast Asian lumber is used primarily for boards, packaging, and industrial products.

Sawmill Production Cost Analysis

The structure and size of sawmills in Japan adversely impacts the financial structure of the industry (Figure 3-2). Production cost estimates for 1996 indicate that Japanese costs are approximately 156% higher than a sawmill in British Columbia, Canada. While labor, energy, and capital costs are less than 50% higher than BC, stumpage prices for *sugi* are 250% higher than hemlock. However, mill size and production capacity has a substantial influence on variable costs like energy and labor. Thus we would expect to see a lower variable cost structure (on a cubic meter basis) in BC, where the average production of a sawmill is approximately 150,000 m^3/year relative to the typical *sugi* sawmill in Japan, which has an average annual production capacity of 7,000 m^3.

Table 3-8. End-Uses for Domestically Produced Lumber (m^3), by Supply Source, 1999.

Log source	Total	Construction			Civil Eng.	Packaging	Industrial	Other
		Boards	Beams	Posts				
Domestic	8,751,000	1,821,000	2,160,000	3,414,000	271,000	685,000	140,000	260,000
S.E. Asia	357,000	76,000	32,000	20,000	6,000	92,000	88,000	43,000
US	5,761,000	545,000	1,934,000	2,548,000	227,000	278,000	131,000	98,000
Russia	2,241,000	199,000	1,270,000	423,000	172,000	101,000	42,000	34,000
NZ	805,000	11,000	18,000	17,000	35,000	695,000	4,000	25,000
Other	250,000	60,000	110,000	8,000	16,000	20,000	12,000	24,000

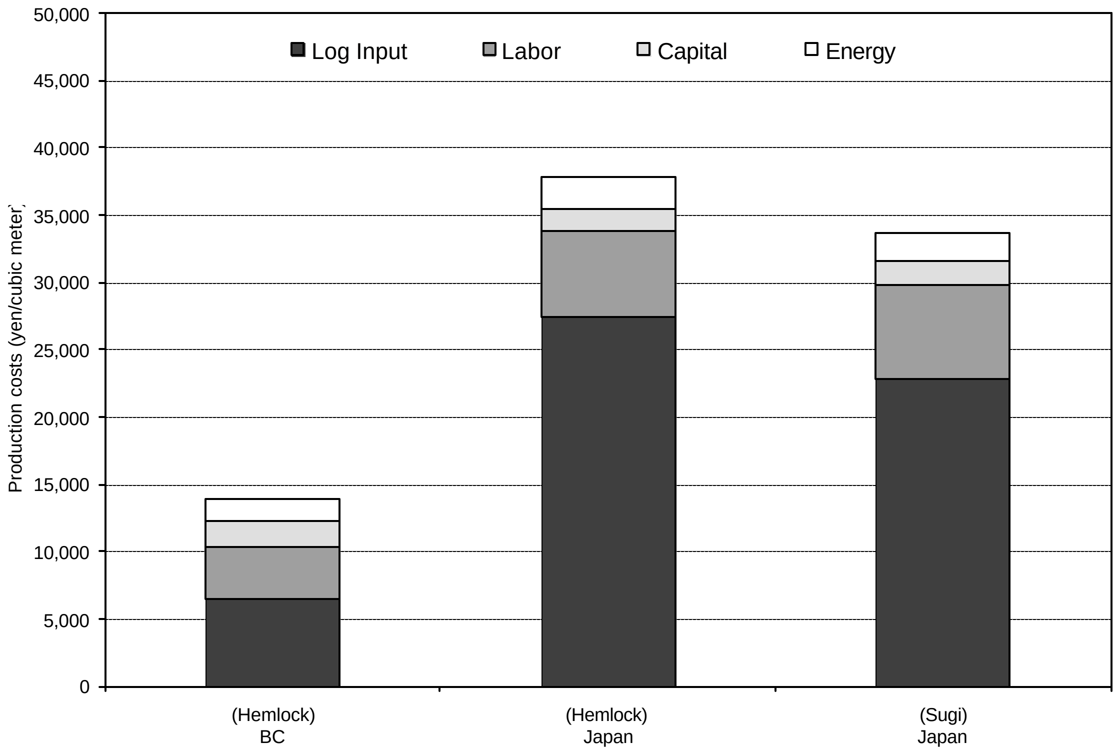


Figure 3-2. Estimated Sawmill Production Costs in British Columbia and Japan, 1996.
Source: Japan Wood-Products Information and Research Center (JAWIC)

Lumber Distribution Channels

The distribution channels for domestically produced and imported lumber in Japan are extended, with several levels of intermediaries at the national, regional, and local levels (Figures 3-3 and 3-4). Lumber distribution involves a number of different entities including domestic manufacturers, primary wholesalers, secondary wholesaler(s), retailers, and home builders. These organizations and individuals perform a variety of functions, including production, inventory, credit (*tegata*), delivery, and service. Primary wholesalers distribute lumber nationally for manufacturers often provide their customers with credit terms. Secondary wholesalers receive lumber products from primary wholesalers and resell them to wholesalers, retailers and builders within a specific geographic region. Secondary wholesalers also provide financing for the customers.

Manufacturers often issue 90-120 day *Tegata* (credit) to the primary wholesaler. The primary wholesaler then typically provides credit terms to secondary wholesalers on a 60 day basis while secondary wholesalers will provide 30 day credit to homebuilders. Tegata are often structured so that the customer pays 50% in cash and receives credit terms for an additional 50% of the price. *Tegata* are often sold by the holder to their bank at a 2.3% discount, and there is usually no interest (essentially an interest free loan).

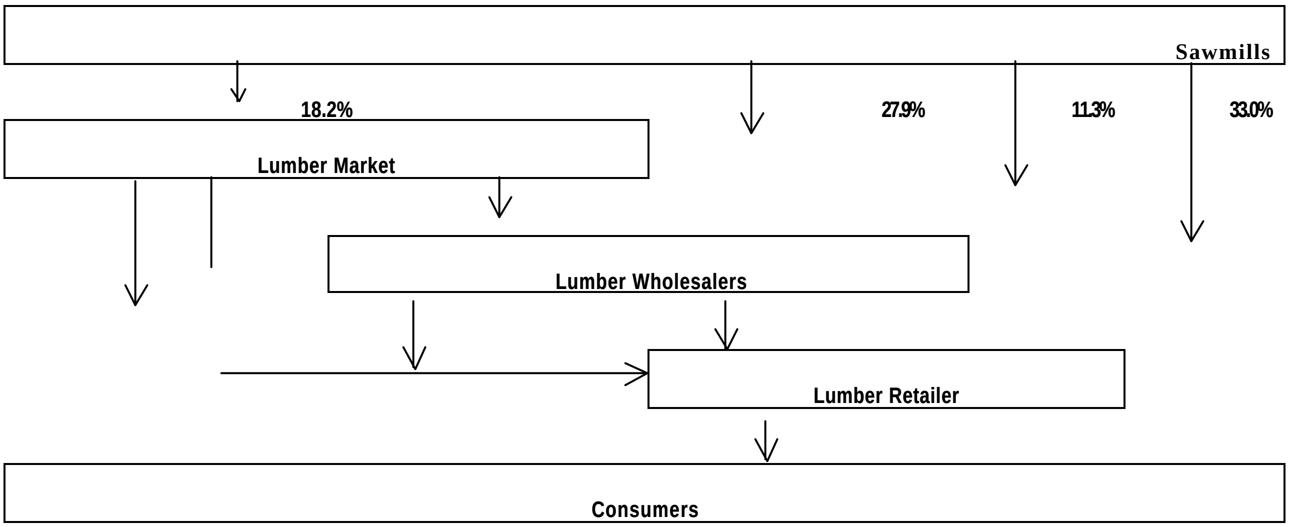


Figure 3-3. Typical Distribution Channels for Domestically-Produced Lumber, 1997.
Source: Ministry of Agriculture, Forestry, and Fishery, 1998.

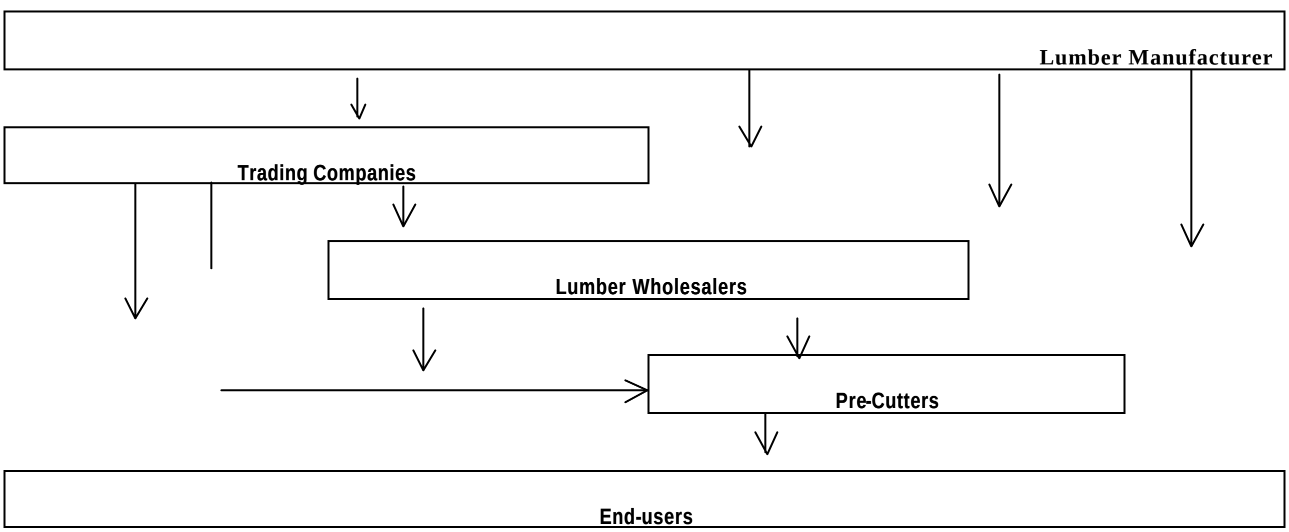


Figure 3-4. Typical Distribution Channel for Imported Lumber, 1997.
Source: Weyerhaeuser Japan

SUMMARY OF TRENDS IN THE SOFTWOOD LUMBER INDUSTRY

There are a variety of factors that have adversely affected Japan's domestic lumber industry. These factors include the structure of the industry itself, including rising production costs and the small, regional structure of the sawmills, regulatory reform within the residential construction industry that has affected the demand for lumber produced from domestic species like *sugi*, and increased imports of low cost, high quality lumber.

The structure of the domestic sawmill industry and its impact on competitiveness has been discussed previously. While many of the regulatory reforms within the residential construction industry were discussed in the first chapter of this report, other regulatory reforms impact the industry as well. For example, in May 2001 the Government Housing Loan Corporation revised their conditions for receiving a home mortgage to require the use of treated lumber for ground sills in all new housing. This means that all new housing purchased using a GHLC mortgage must utilize treated lumber in ground sill applications that meets or exceeds the JAS K3 criteria. Previously ground sills were only required to meet the JAS K2 criteria. This regulatory change was adopted to meet the new ten-year housing warranty requirement contained within the Housing Quality Assurance Act (HQAA) adopted last year. The new requirement will likely exclude the use of a domestic species such as larch, which is difficult to treat with preservatives, in ground sill applications. Until now, larch ground sills had been used extensively in the central interior districts of Japan.

It is also generally accepted that the housing construction industry will start to use kiln-dried lumber to meet the ten-year warranty criteria specified by the HQAA. But while demand is expected to rise, a recent survey of the sawmill industry by the Forestry Agency found that in 1999 only 1,452 sawmills (9.3% of total) had dry kilns. The volume of kiln-dried lumber produced domestically increased to 1.98 million m^3, a 13.6% increase from 1998. The volume of kiln-dried lumber produced in 1999 represents 11.1% of total lumber production in Japan. However, the 1.98 million m^3 of kiln dried lumber produced in 1999 was just one-third of the installed production capacity for the industry.

Finally, there is little doubt that foreign companies have increased their lumber exports to Japan. Often this foreign lumber is lower priced and higher quality than domestically produced lumber and local manufacturers find themselves at a competitive disadvantage in many of the larger urban markets. In part, this is a reflection of the continued strength of the yen relative to foreign currencies, partly in Canada and northern Europe. While the competition is somewhat less in local, rural markets, many foreign companies are actively looking to expand their sales into these markets. There is little doubt that competition within the Japanese lumber market will continue to increase. The increasingly competitive business environment will force more consolidation and closures within Japan's sawmill industry, particularly within the small ‘mom-and-pop’ segment of the industry. Thus, in order to remain viable operations, domestic lumber manufacturers must develop a strategy that will allow them to compete within the new business environment.

CHAPTER 4. PLYWOOD INDUSTRY

PLYWOOD INDUSTRY DEMOGRAPHICS

Plywood Production, by Product Type

The 1990s have seen two trends develop in the plywood industry in Japan (Table 4-1). The most obvious has been the closure of a substantial number of plywood mills due to two factors. First came the bursting of the bubble in the late 1980s, which hurt demand for domestically produced tropical hardwood plywood. At the same time, the industry began to produce softwood plywood as a strategy for competing with the low priced tropical hardwood plywood being imported first from Indonesia and then Malaysia. (A summary of statistics for the plywood industry is provided in Appendix C).

From 1990-2000, the number of plywood mills in Japan declined from 522 to 354 while the plywood production declined from 6.7 million m^3 to 3.2 million m^3, a 52.3% drop. From1993-2000, tropical hardwood plywood production was down 62.7% while combination plywood production declined 30.6%. In contrast, softwood plywood production jumped from 769,872 m^3 in 1993 to 1.2 million m^3 in 2000, a dramatic 366% increase. By the end of the decade, the share of softwood plywood in total plywood production increased from less than 10% to 47.9%, representing a stunning transition of the industry.

Table 4-1. Domestic Japanese Plywood Production, 1990-2000 (m^3).

	Number of Mills	Total Production	Total Hardwood	Total Softwood	Softwood Ratio (%)	Softwood	SW-HW Combination
1990	522	6,738,000	n/a	n/a	n/a	n/a	n/a
1991	517	6,589,000	n/a	n/a	n/a	n/a	n/a
1992	506	5,953,000	n/a	n/a	n/a	n/a	n/a
1993	490	5,260,000	4,490,128	769,872	14.6	254,042	515,830
1994	472	4,864,000	3,889,912	974,088	20.0	456,827	517,261
1995	455	4,420,436	3,379,190	1,041,246	23.6	517,185	524,061
1996	439	4,625,856	3,137,223	1,488,633	32.2	777,621	711,012
1997	420	4,256,648	2,787,044	1,469,604	34.5	913,689	555,915
1998	398	3,266,753	2,060,424	1,206,329	36.9	815,659	390,670
1999	378	3,261,443	1,906,168	1,355,275	41.6	1,001,601	353,674
2000	354	3,215,624	1,673,864	1,541,760	47.9	1,183,689	358,071

Table 4-2. Number of Plywood Mills and Production (m^3) in Japan, by Region (1996 vs 1999).

Region	1996						1999					
	Mills	Workers	Wrkrs per mill	Plywood Prod.	Prod. per worker	Prod. Per mill	Mills	Workers	Wrkrs per mill	Plywood Prod.	Prod. per wrkr	Prod. per mill
Total	439	23,094	52.6	4,625,856	200.3	10,537	378	17,991	48	3,261,443	181.3	8,628
Hokkaido	52	3,381	65.0	357,726	105.8	6,879	41	2,562	62	224,848	87.8	5,484
Tohoku	42	2,929	64.5	1,471,757	502.5	35,042	43	2,639	60	1,389,390	526.5	32,311
Kanto	34	2,399	72.8	590,360	246.1	17,364	27	2,013	71	326,434	162.2	12,090
Chubu	118	5,728	60.8	673,139	117.5	5,705	100	4,205	51	434,174	103.3	4,342
Kinki	40	1,972	37.8	223,390	113.3	5,585	33	1,512	35	173,244	114.6	5,250
Chugoku	50	3,035	88.2	1,040,986	343.0	20,820	46	2,370	76	553,421	233.5	12,031
Shikoku	16	1,991	104.2				14	1,457	76			
Kyusu-Okinawa	87	1,659	35.5	268,499	161.8	3,086	74	1,388	33	159,932	115.2	2,161

Note: Chugoku and Shikoku were combined for the production and production per mill categories.

Number of Plywood Mills and Plywood Production by Region

The largest regional grouping of plywood mills is located in the Chubu region. This region houses 26.5% of Japan's plywood mills (Table 4-2). Although the Chubu region, is home to the greatest number of plywood mills it is a distant third in the total volume of plywood produced in Japan. Japan's greatest volume of plywood is produced in the Tohoku region (1.4 million m^3), followed by the Shikoku/Chugoku regions with just over 550,000 m^3. In contrast, the plywood industry in the Chubu region produced just 434,174 m^3 of plywood in 2000. In addition, the plywood mills in Chubu region tend to be smaller than in many of the other regions with the exception of the Kinki and Kyushu-Okinawa regions.

Plywood Mill Productivity

Productivity in the plywood industry varies significantly across the different regions of Japan (Table 4-2). The highest level of productivity by far is observed in the Tohoku region where the average plywood mill produces 32,311 m^3 of plywood annually and worker productivity reaches 526.5 m^3 per employee. In contrast, the plywood mills in the Chubu and Kyushu/Okinawa regions produce just 4,342 and 2,161 m^3 of plywood annually, respectively. The corresponding levels of worker productivity for these regions is 103.3 m^3 and 115.2 m^3, respectively. The lowest level of worker productivity is found in Hokkaido where the average mill produces 5,484 m^3 of plywood annually but worker productivity is just 87.8 m^3 per employee.

SUMMARY OF TRENDS IN THE PLYWOOD INDUSTRY

The plywood industry in Japan has struggled to cope with several major changes over the past three decades. During the 1970s, competition from lower priced Korean plywood forced the Japanese plywood industry to transition from an export-oriented industry to a domestic-focused industry. Then, in the mid-1980s a log export ban by Indonesia caused rapid price increases and disruptions in tropical hardwood log supplies that led to the closure of older, less efficient mills and forced other mills to scramble to identify new raw material supplies. The rapid growth of the Indonesian plywood industry into the leading exporter of plywood globally led to a new set of challenges for the Japanese plywood industry. The huge wave of low cost, high quality Indonesian plywood forced a new wave of mill closures in Japan and led other mills to shift their raw material supply away from tropical hardwood logs towards softwood logs. Today, many Japanese plywood mills have shifted to producing softwood plywood or a combination of softwood/hardwood plywood. To a large degree these mills utilize a combination of radiata pine veneers for the core layers and Russian pine and larch veneers for the face layers.

Increasing imports of oriented strandboard (OSB) will pose a challenge for the plywood industry in the future, although OSB has been slow to gain acceptance with homebuilders. There are two reasons for the resistance to using OSB. First, many builders and home buyers are concerned that OSB will not perform well in the hot humid climate in Japan and second, many OSB manufacturers have been reluctant to provide OSB in the 3’x6’ size that Japanese builders prefer (as compared to the standard 4’x8’ panel size utilized in North America). Currently there are no OSB mills in Japan. Given the relatively high cost structure and reliance on imported raw materials, many industry experts predict that there will be continued consolidation and mill closures within the plywood industry as well as continued investment in production facilities in southeast Asia (primarily Indonesia and Malaysia) and Mainland China.

CHAPTER 5. GLUE LAMINATED LUMBER INDUSTRY

GLULAM INDUSTRY DEMOGRAPHICS

Number of Glulam Mills by Region

There were 281 manufacturers of glue-laminated (glulam) lumber in Japan in 2000. While glulam manufacturers are located across Japan, over half (53.7%) are located in the northern and central regions of Tohoku, Chubu, and Kinki. (The number of glulam manufacturers operating within each prefecture is provided in Appendix D).

Glulam Production by Product Type

The production of glulam lumber has increased substantially during the 1990s, particularly during the latter half of the decade. From 1991-1995, glulam production increased by 27.9% from 455,000 m^3 to 581,800 m^3. In contrast, from 1995-2000, glulam production jumped by 53.3%, rising from 581,800 m^3 to a record 892,000 m^3.

The mix of products manufactured has undergone a significant change during this period as well. For example, non-structural glulam lumber production has decreased since the mid 1990s while structural glulam lumber production has increased rapidly since 1991. Nonstructural glulam lumber is classified as overlay products and millwork products. Overlay products are non-structural products used in applications where a high quality appearance is important, for example in a traditional tatami room. The decline in the number of traditional tatami rooms included in new residential construction has reduced the demand for non-structural appearance grade glulam lumber products. As a result, production of non-structural glulam products has declined 29% since 1996, from 379,800 m^3 in 1996 to 269,700 m^3 in 2000.

In contrast, there has been increased demand for structural glulam lumber. Structural glulam products are often classified into large beams, medium beams, and small beams. Although there is some debate about the exact criteria for each classification, the Japan Laminators Association defines large glulam lumber as having a cross section of more than 300 cm^2 and these products are often used as horizontal beams. In contrast, small glulam lumber usually has dimensions of less than 150mm in width and thickness. Small glulam lumber is usually used in vertical post (*hashira*) applications. Finally, medium size beams fall between the two previously mentioned products and can be used as either vertical posts or horizontal beams.

Table 5-1. Number of Glulam Manufacturers in Japan, by Region (2000).

Region	Mills
Total	281
Hokkaido	28
Tohoku	43
Kanto	29
Chubu	55
Kinki	53
Chugoku	17
Shikoku	23
Kyushu-Okinawa	33

Table 5-2. Domestic Japanese Glulam Production, 1991-2000 (m^3).

	Non-structural			Structural					Total
	Overlay	Millwork	Subtotal	Dec. Post	Lg. beams	Med. Beams	Sm. Beams	Subtotal	
1990									
1991	127,800	200,700	328,500	84,000	16,800	16,700	9,000	126,500	455,000
1992	122,400	201,600	324,000	83,900	16,600	17,800	9,000	127,300	451,300
1993	131,200	225,300	356,500	87,500	20,400	21,900	10,200	140,000	496,500
1994	141,600	235,600	377,200	102,400	22,800	29,000	19,900	174,100	551,300
1995	141,900	231,800	373,700	97,300	29,700	37,400	43,700	208,100	581,800
1996	144,700	235,100	379,800	102,100	35,300	61,100	141,600	340,100	719,900
1997	142,200	228,700	370,900	95,600	29,300	65,500	194,600	385,000	755,900
1998	121,600	185,200	306,800	67,600	33,900	93,400	179,300	374,200	681,000
1999	114,300	168,500	282,800	80,900	35,000	120,900	246,900	483,700	766,500
2000	106,400	163,300	269,700	70,700	36,200	189,200	326,200	622,300	892,000

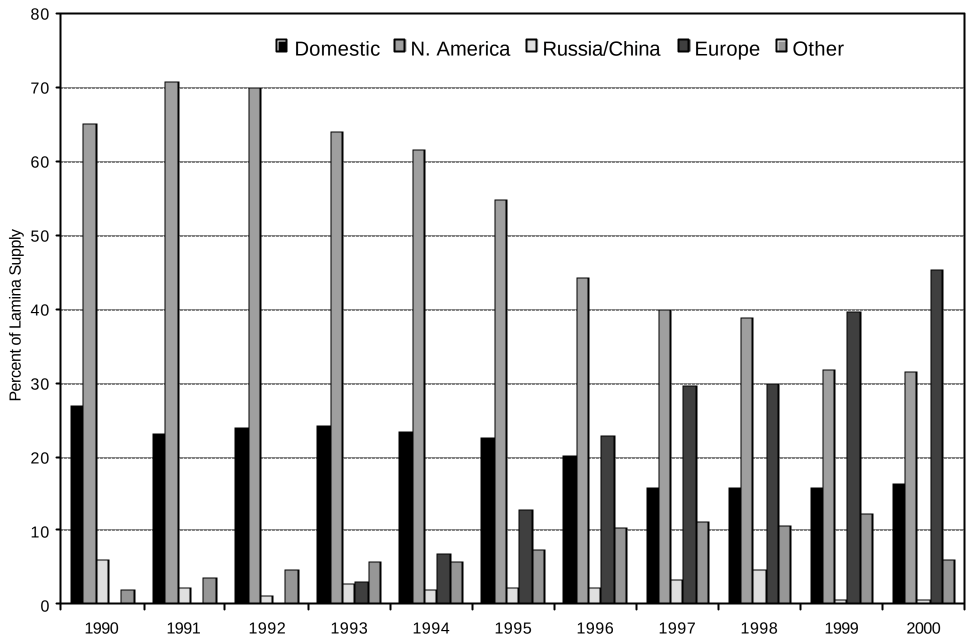


Figure 5-1. Lamina Supply Regions for Glulam Production in Japan, 1990-2000.

Although the production of most structural glulam products increased during the 1990s, the exception to this is decorative posts, which have declined from 102,100 m^3 in 1996 to 70,700 m^3 in 2000. As mention previously, much of the decline in demand is attributed to reduced demand for traditional tatami rooms in post and beam homes. Production of large size beams, the smallest segment of this market, has more than doubled since 1991, increasing to 36,200 m^3 in 2000.

In contrast, the demand for medium and small size glulam lumber has skyrocketed. Medium size beams have increased more than 10 times (to 189,200 m^3 in 2000) and small size posts increased more than 35 times (to 326,200 m^3 in 2000). Total structural glulam lumber production increased by more than 4 times during the 1990s, reaching 622,300 m^3 in 2000. As a result, the share of structural glulam lumber as a percentage of total glulam lumber production increased from 27.8% in 1991 to 69.8% in 2000.

The increasing demand for glulam lumber represents a new opportunity for lumber manufacturers to provide kiln-dried lamina used in the production of glue laminated lumber products. As a result, competition within this new segment has increased substantially with new foreign entrants looking to supply lamina products to Japanese glulam manufacturers (Figure 5-1). Whereas the primary suppliers of lamina lumber were North American companies and domestic Japanese sawmills (with a market share of 65.1% and 26.9%, respectively), recent strong competition from European suppliers has changed the structure of the market. In 2000, European suppliers had a market share of 45.3% while the market shares of North American and Japanese suppliers had dropped to 31.5% and 16.3%, respectively.

SUMMARY OF TRENDS IN THE GLULAM INDUSTRY

Manufacturers of structural glulam lumber have derived tremendous benefits from two significant changes that have affected the demand for wood products in the residential construction industry. The first major change is the increased use of pre-cut components in the construction of post and beam homes. The second has been the passage of the Housing Quality Assurance Act and the Ten Year Housing Warranty provision contained within the HQAA. Both of these changes have increased the demand for glulam lumber because of its greater dimensional stability relative to solid wood structural lumber, particularly in the larger cross-sectional sizes. There is little doubt that the demand for these products will continue to increase as the HQAA and the Ten Year Housing Warranty are fully implemented.

CHAPTER 6. JAPANESE SOLID WOOD IMPORTS

TOTAL SOFTWOOD LUMBER IMPORTS

Softwood Lumber Imports 1996-2000

In contrast to the historical increase in Japanese lumber imports, lumber imports declined during the 1996-2000 period (Figure 6-2). Lumber imports, which reached a record volume in 1997, declined precipitously in response to the Asian economic crisis. Import volumes have started to recover and reached 8.7 million m^3 in 2000. Canada remains Japan's leading supplier of lumber, accounting for approximately 50% of Japan's softwood lumber imports in 2000. In addition, European lumber imports increased rapidly from 1993-2000. Europe exported essentially no lumber to Japan during the early 1990s, yet they are now have positioned the second leading supplier of softwood lumber to Japan, exporting almost 1.5 million m^3 in 2000. To develop a better understanding of the dynamics of the Japanese market for imported softwood lumber, the remainder of this section will focus on 1996-2000. The discussion will refer to lumber products using the Harmonized System of product classification at the 9-digit level. The first 6 digits of each lumber product classification (HS 4407-10) indicate that the product is softwood lumber. The final three digits of the HS code refer to the species, size, and condition of the product. Thus, in the HS code 4407-10.323, the three-digit suffix (323) refers to planed Douglas-fir lumber that is less than160mm thick.

From 1996-2000, Japanese imports of SPF planed lumber (HS4407-10.110), pine planed lumber (HS 4407-10.121), and spruce/fir planed lumber (HS4407-10.129) have generally increased (Figure 6-3). Imports of pine and spruce/fir lumber were fairly similar (just over 1 million m^3) while SPF imports were substantially higher at approximately 2.8 million m^3 in 2000.

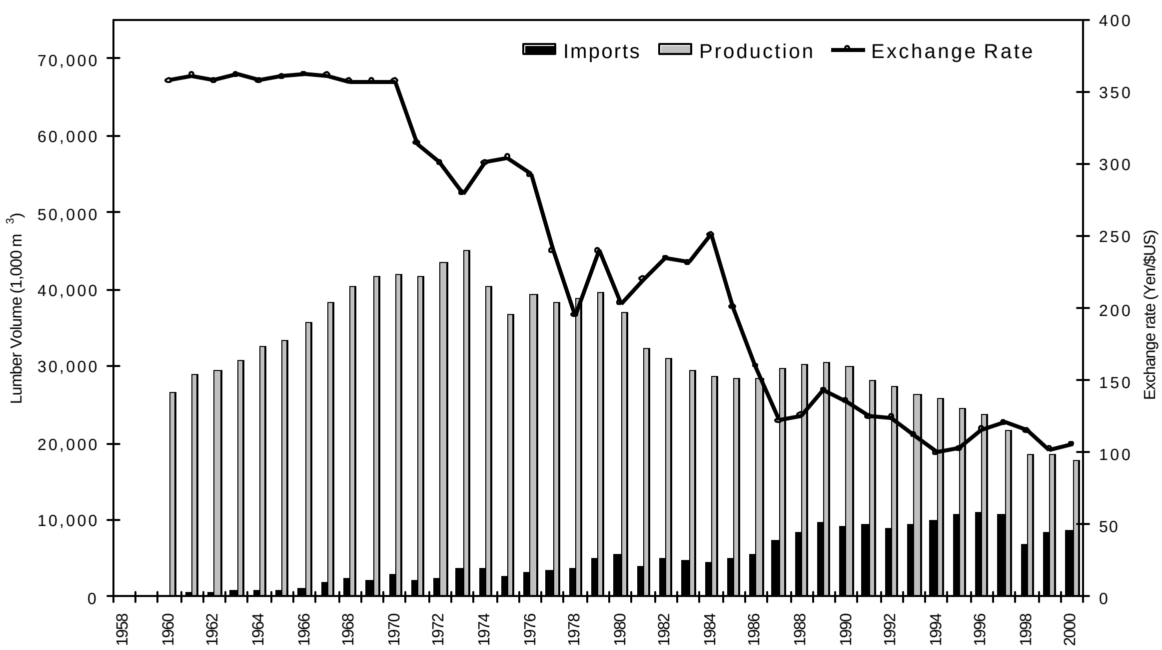


Figure 6-1. Japanese Lumber Production, Imports and Exchange Rate, 1958-2000.

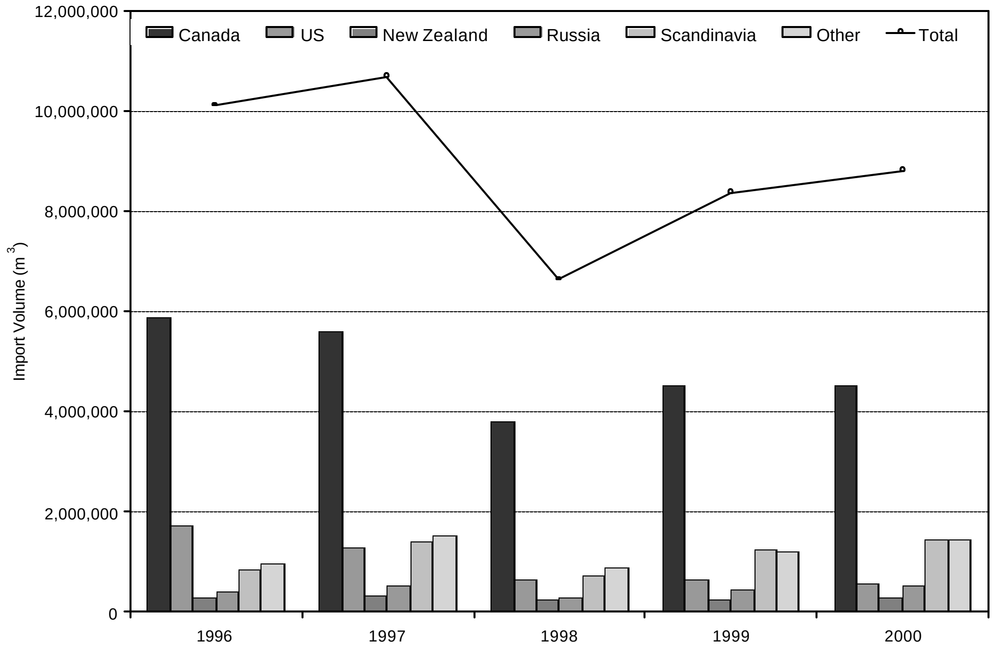


Figure 6-2. Total Japanese Softwood Lumber (HS 4407.10) Imports, 1996-2000.

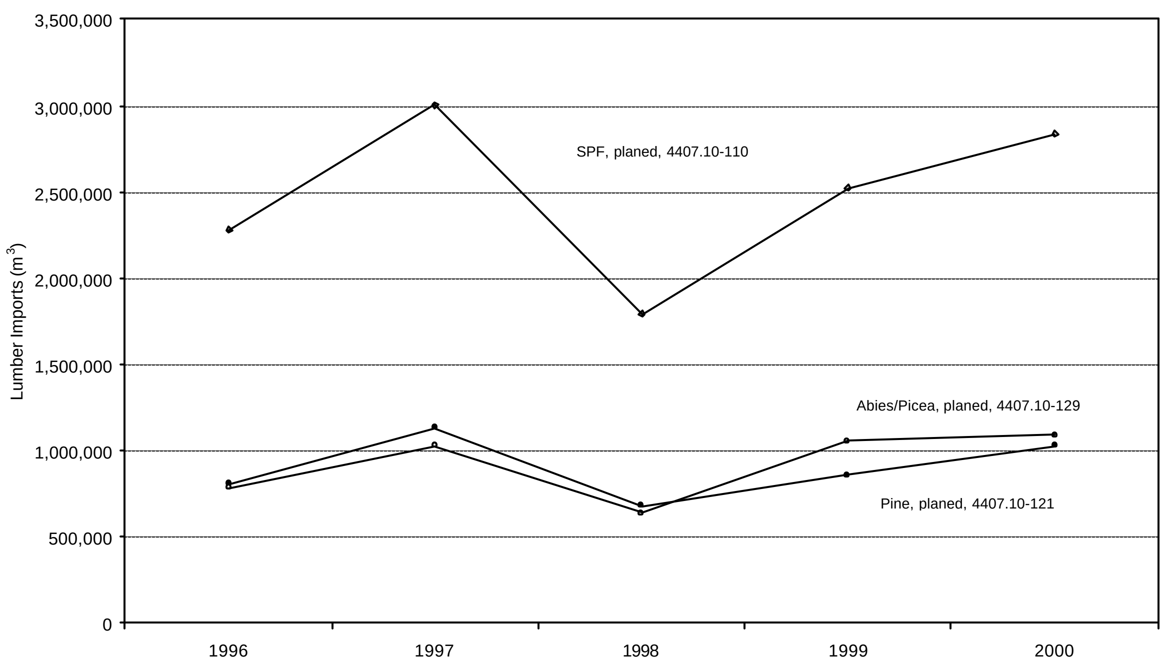


Figure 6-3. Japan Imports of SPF, Pine, and Spruce/Fir Planed Lumber, 1996-2000.

Canada's volume of SPF lumber to Japan has dropped slightly from 1.6 million m^3 in 1996 to 1.5 million m^3 in 2000 (Figure 6.4). However, strong gains by other exporters mean that the Canadian share of the market has dropped from 68.6% to 53%, while the European market share almost doubled from 9.4% to 18.6%, and the share of other suppliers (including Chile) climbed from 18.4% to 24.8%. The US, which is not a strong participant in this segment of the market, saw its market share shrink marginally from 1.5% to 0.8%.

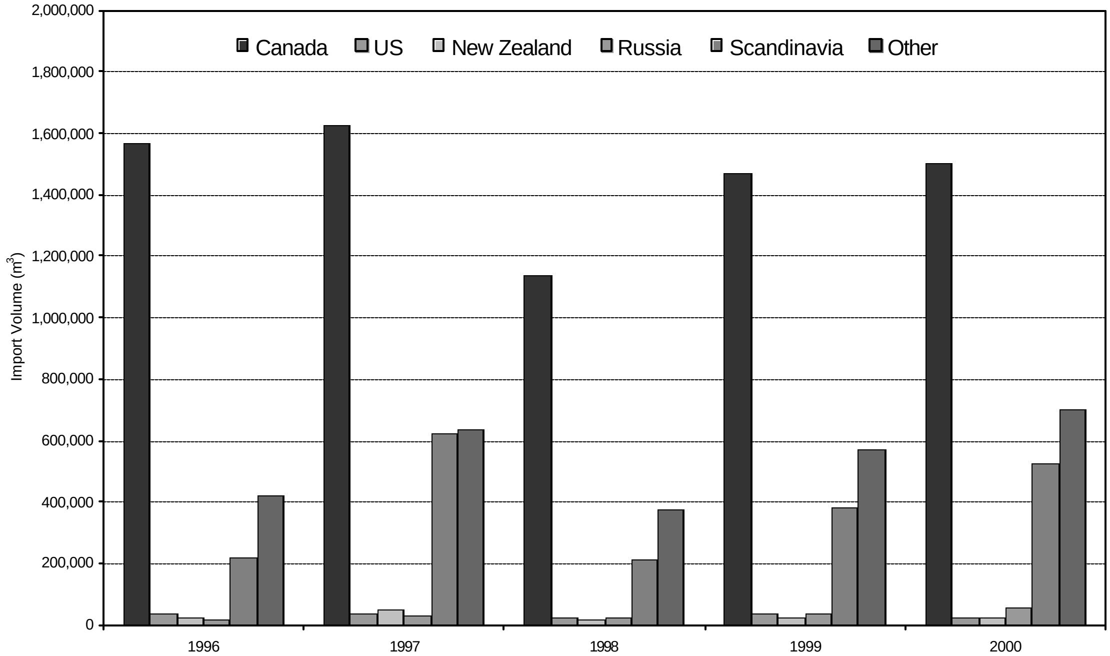


Figure 6-4. Japan Imports of SPF Planed Lumber (HS 4407.10-110), by Country.

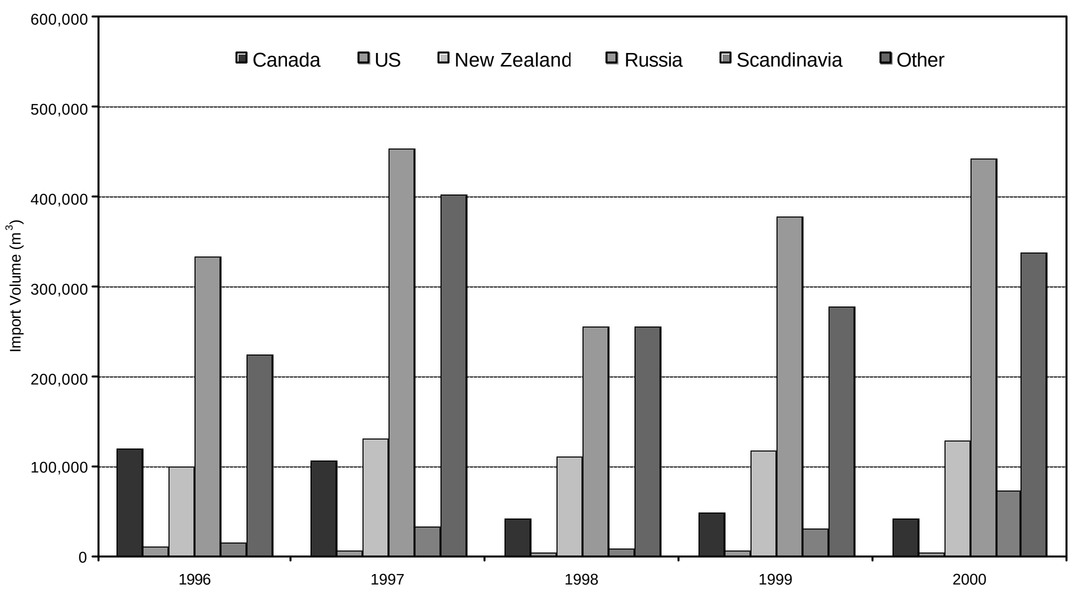


Figure 6-5. Japan Imports of Pine Planed Lumber (HS 4407.10-121), by Country.

Japanese imports of planed pine and spruce/fir lumber from 1996-2000 are summarized in Figures 6-5 and 6-6. Japan's leading suppliers of pine are Russia (43% share), Chile (31% share), and New Zealand (13% share). While Russia and Chile have been increasing their pine exports to Japan, New Zealand has maintained a constant volume of approximately 120,000 m^3. US exports of planed pine lumber have declined from 11,600 to 2,900 m^3 and their market share has fallen from 1.4% to 0.3%. European companies dominate the spruce/fir market in Japan with a market share of 77.6% in 2000 (Figure 6-6). Russia and Canada are the only other countries that have significant shares in the spruce/fir market, with market shares of 3.2% and 1.0%, respectively.

In 1996, Japan discontinued the HS code 4407.10-320 (softwood lumber, planed, not elsewhere specified [n.e.s.]) and replaced it with three new products categories: hemlock, planed (HS 4407.10-322), Douglas-fir, planed (HS 4407.10-323), and planed, n.e.s. (4407.10-329). This change is significant because the original product category included almost 3.8 million m^3 of softwood lumber imports in 1996. Ostensibly, the reason for the change in HS codes was to allow the Japanese to have a better understanding of the composition of the lumber products included in this customs code. The import trends for these new customs codes are summarized in Figure 6-7.

The new classification system shows that planed hemlock and Douglas fir lumber were the primary products classified under the old code. From 1997-2000, imports of planed hemlock lumber declined by 38% to 1.2 million m^3 while imports of planed Douglas-fir lumber remained fairly stable at approximately one million m^3. Imports of non-specified softwood lumber plummeted from 3.7 million m^3 in 1996 to less than 250,000 m^3 in 2000.

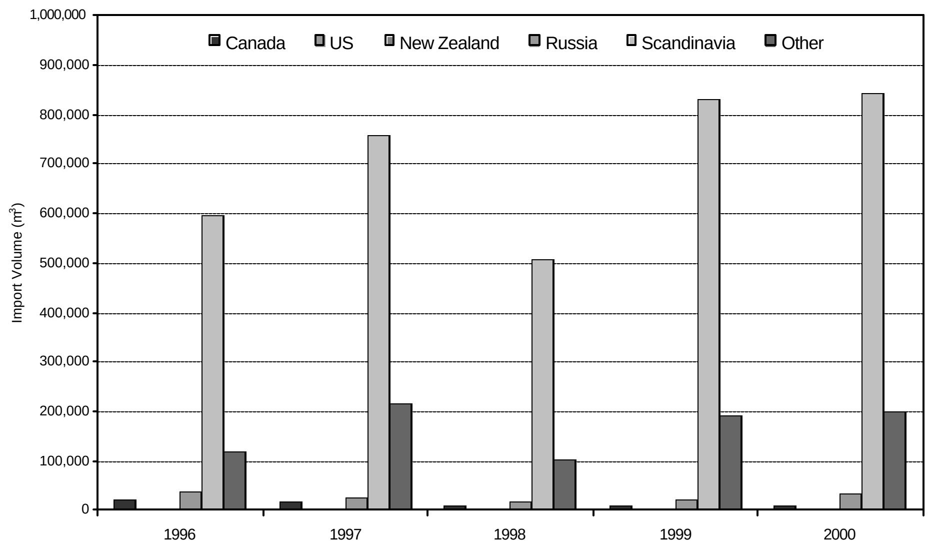


Figure 6-6. Japan Imports of Spruce/Fir Planed Lumber (HS 4407.10-129) by Country.

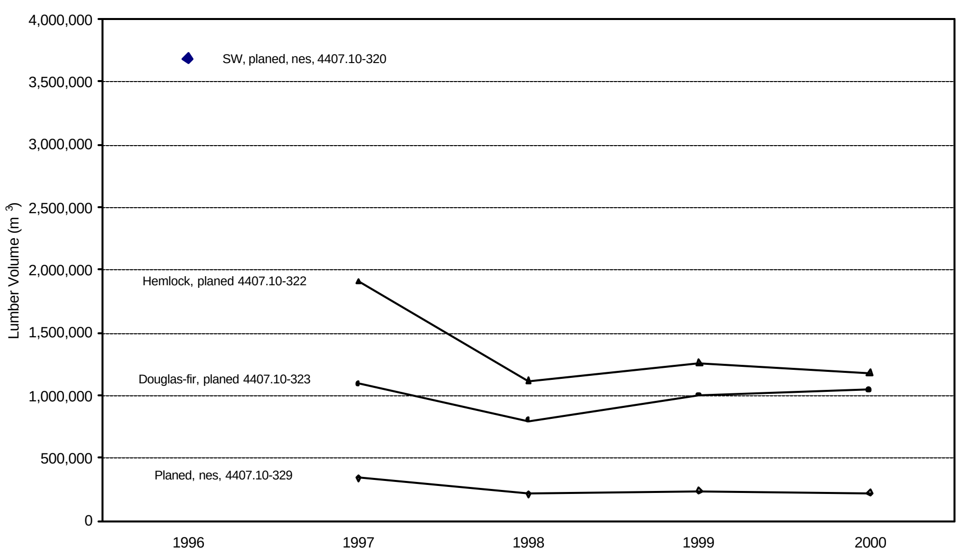


Figure 6-7. Japanese Imports of Douglas-Fir and Hemlock Planed Lumber, 1996-2000.

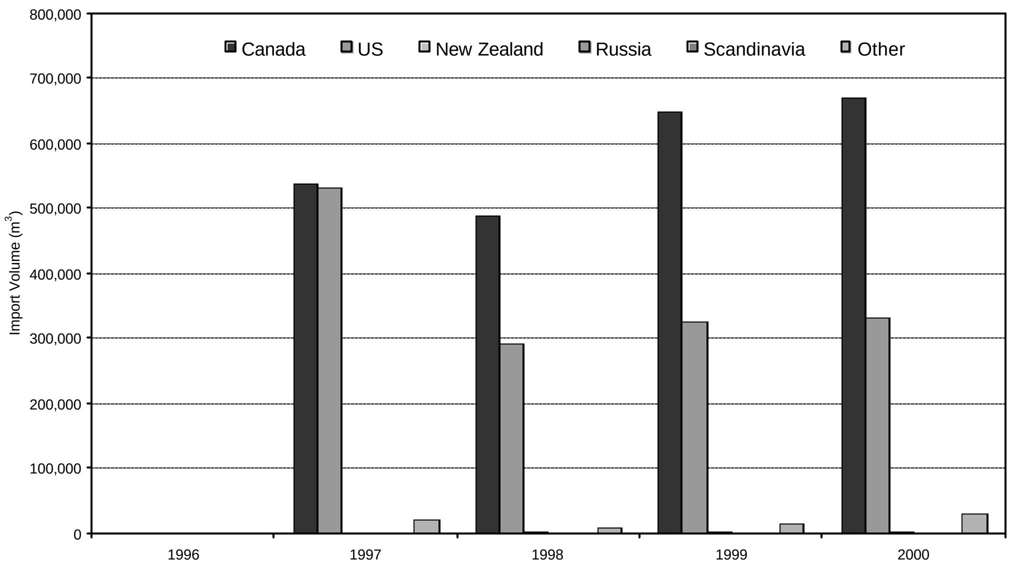


Figure 6-8. Japan Imports of Douglas-Fir Planed Lumber (HS 4407.10-323) by Country.

Canada and the US have traditionally dominated the Japanese market for imported planed Douglas-fir lumber (Figure 6-8). However, from 1997-2000 Canadian exports rose from 538,000 to 630,000 m^3 while US exports dropped from 531,000 to 333,000 m^3. As a result, the Canadian market share jumped from 49% to 64.4% and the US market share declined from 48.8% to 32%. Part of this loss can be explained by US firms focus on the growing US demand for softwood lumber. The hemlock market, which has been declining over the past decade, is also dominated by the US and Canada (Figure 6-9). In this market Canadian exports have dropped from 1.4 million m^3 to 1 million m^3 while US exports have dropped from 450,000 m^3 to 120,000 m^3. In 2000, the US and Canada's market shares were 10.1% and 87.9%, respectively.

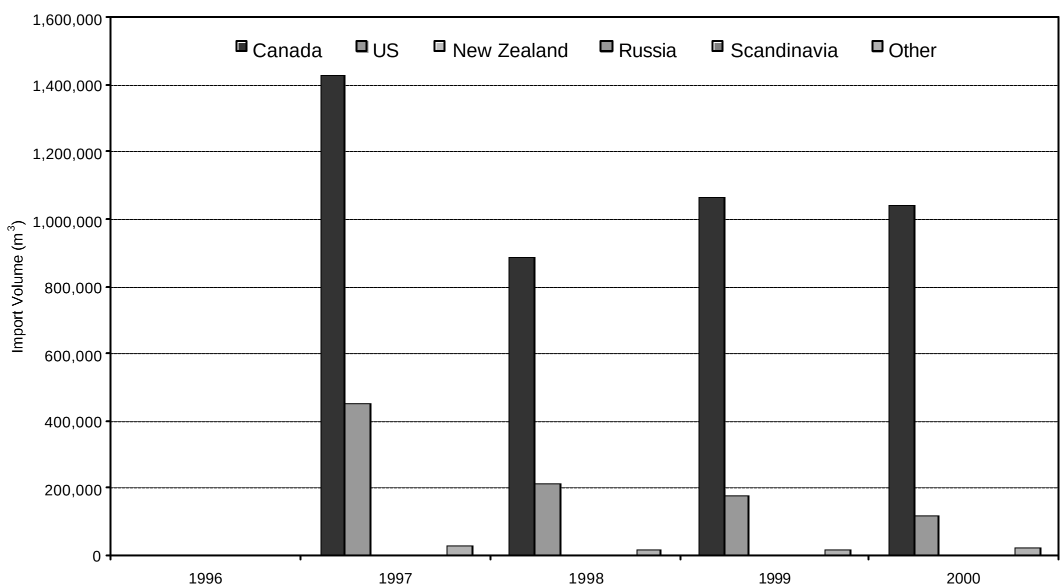


Figure 6-9. Japan Imports of Hemlock Planed Lumber (HS 4407.10-322), by Country.

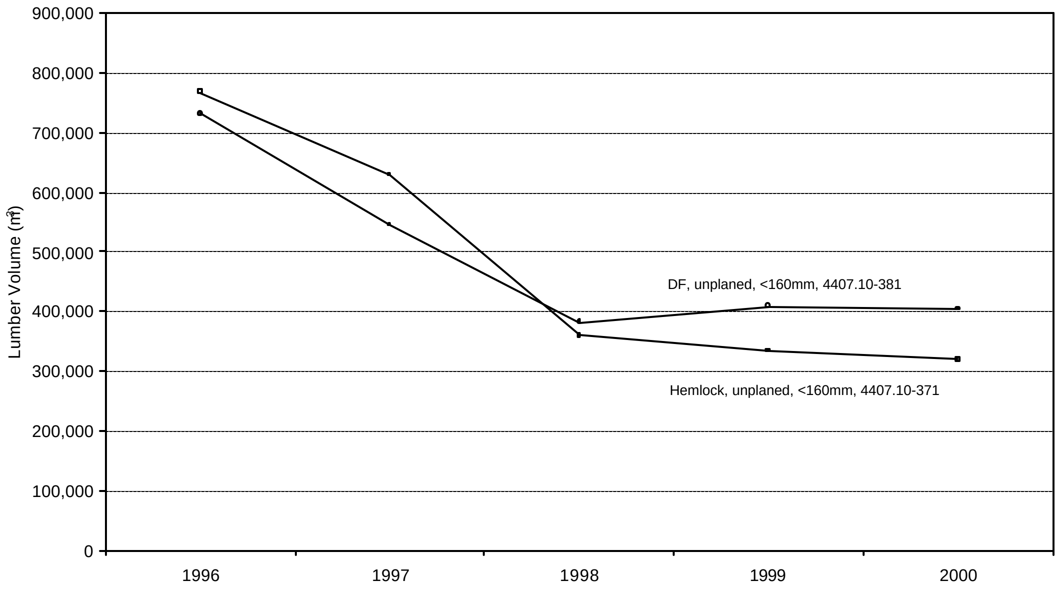


Figure 6-10. Japan Imports of Douglas-Fir and Hemlock Unplaned Lumber, 1996-2000.

Imports of unplaned Douglas-fir and hemlock lumber have declined substantially since 1996 (Figure 6-10). These products are generally exported green (undried) and are often used as posts (*hashira*) in post and beam construction. Douglas-fir imports have dropped by 44.8% while hemlock imports declined by 58.5%. The trade data clearly shows that the hemlock market is overwhelming dominated by the Canadians, with a market share of 95.8% (Figure 6-11). In contrast, the US was a strong competitor in the Douglas-fir market in 1996, although their market share had dropped significantly by 2000 (Figure 6-12). In 1996, the US and Canadian shares of the undried Douglas-fir market were 66.8% and 32.2%, respectively. However, in 2000 the Canadian share had increased to 86.7% while the US share had declined to 11.8%.

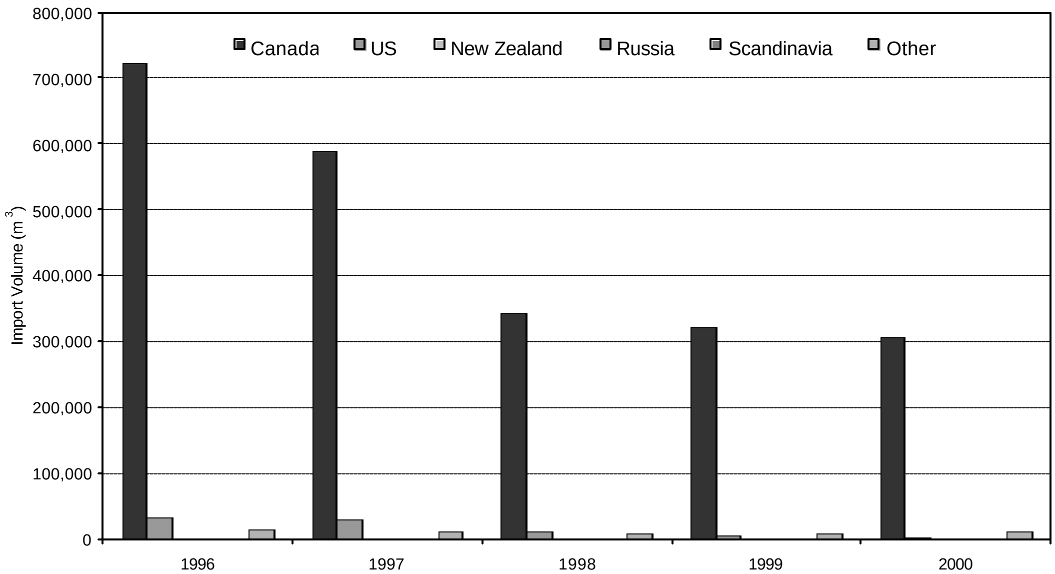


Figure 6-11. Japan Imports of Hemlock (<160mm) Unplaned Lumber (HS 4407.10-371) by Country.

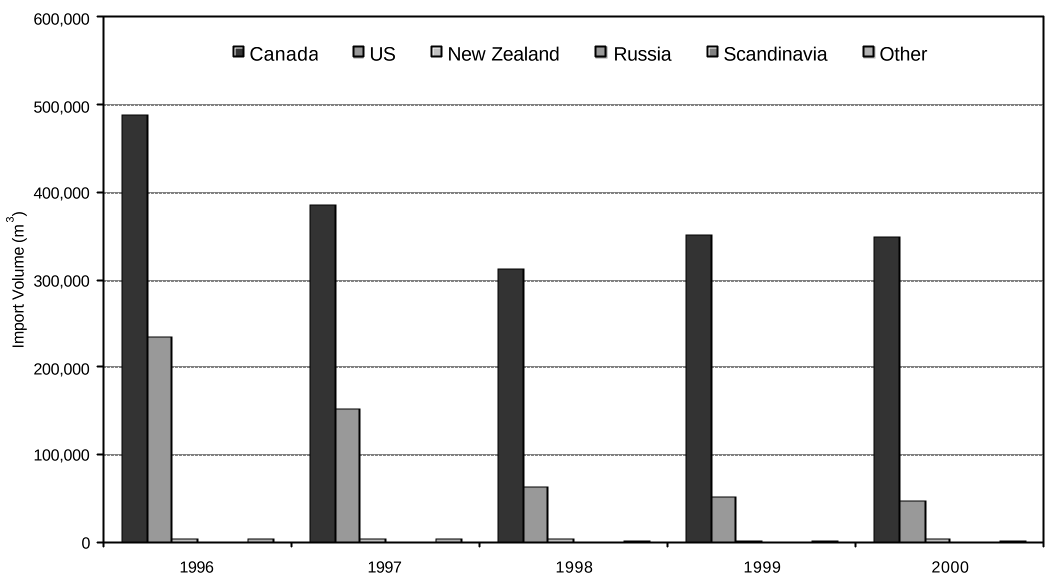


Figure 6-12. Japan Imports of Douglas-fir (<160mm) Unplaned Lumber (HS 4407.10-381) by Country.

Plywood and Laminated Veneer Lumber (LVL) Imports

Suppliers in Indonesia and Malaysia continue to dominate the Japanese imported plywood market (Figure 6-13). From 1995-2000, plywood imports increased by 11.8%, reaching 4.8 million m^3 in 2000. Over this period, imports from Indonesia declined by 8.4% while imports from Malaysia increased by 83.9%. As a result, Indonesia's share of the Japanese market has dropped from 70.2% to 57.6% while Malaysia's market share has increased from 22.6% to 37.1%. The success of Malaysia can be attributed to two factors. First, the plywood cartel arrangement between APKINDO in Indonesia and NIPPINDO in Japan was dismantled in 1998. In addition, the success of Malaysia can also be directly attributed to Japanese investment in the plywood production sector of the Malaysian economy.

Imports of laminated veneer lumber (LVL) reached a record volume of 83,2170 m^3 in 2000 (Figure 6-14). Since 1993, LVL imports have increased by a remarkable 568%. Most of this growth can be attributed to increased imports of hardwood LVL, which increased from a level of essentially zero imports in 1993. In contrast, imports of non-structural softwood LVL have decreased by 22.4% since 1996 after displaying rapid growth from 1993-1996. The results of these changes in the mix of LVL products has been to substantially reduce the share of non-structural LVL relative to hardwood LVL and structural softwood LVL.

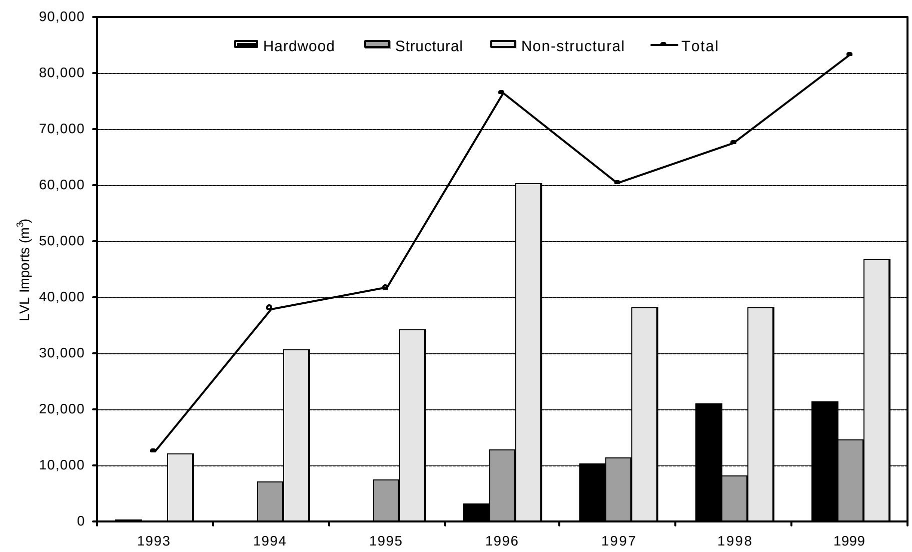


Figure 6-13. Japan Imports of Plywood by Country.

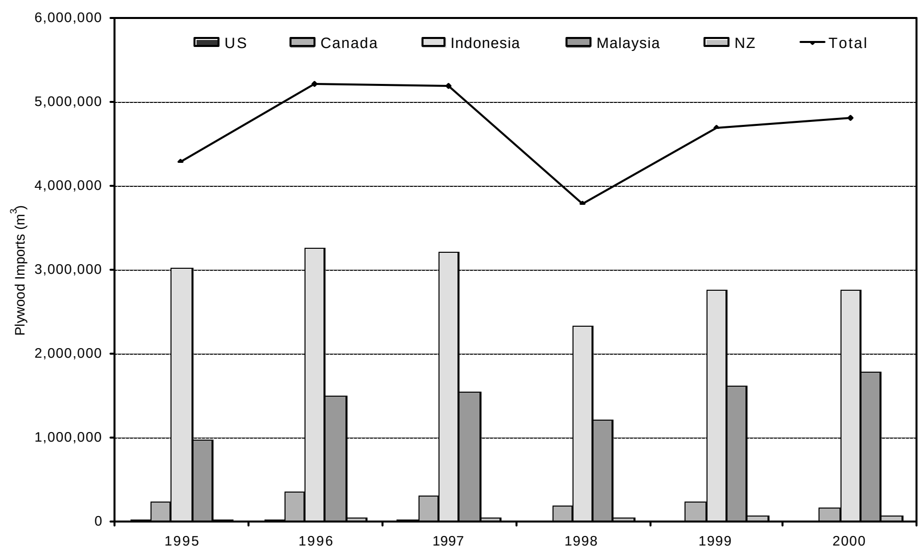


Figure 6-14. Japan Imports of Laminated Veneer Lumber (LVL) by Product.

Glulam Imports

Three different product classifications are included in the glulam lumber import statistics (Figure 6-15). These product classifications include HS 4412.29-010 (laminated lumber with at least one outer ply of non-coniferous wood), HS 4412.99-010 (laminated lumber n.e.s.), and HS 4418.90-222 (structural laminated lumber). Total imports of glulam lumber have increased by over 600% since 1993, although the vast majority of this increase can be attributed to imports of structural laminated lumber. In 2000, imports of structural laminated lumber represented 81.9% of total glulam lumber imports. The structural laminated lumber market is dominated by Europe with 299,420 m^3 in 2000 (67.3% share), followed by the US (40,172 m^3 and a 9% share), Canada 35,163 m^3 and a 7.9% share), Russia (27,311 m^3 and a 6.1% share), and China (16,008 m^3 and a 3.6% share).

SUMMARY OF IMPORT TRENDS

Japanese imports of lumber have increased rapidly since 1958, reaching a record volume of just over 11 million m^3 in 1996 before declining during the economic recession. Growing demand for imported lumber can be attributed to several fundamental factors. Strong growth in the housing sector, which has traditionally favored wooden houses, has generated the basic demand for lumber in Japan. The high cost of growing, harvesting and manufacturing lumber provided the initial opportunity for foreign lumber to enter the Japanese market. The strong yen that resulted from the Bretton-Woods agreement in the mid-1970s led to a situation where imported lumber was often cheaper than domestically produced lumber. The relationship between the exchange rate and lumber imports is clearly illustrated in Figure 6-1, with imports tending to grow when the yen strengthens. The net result of these market dynamics is that lumber imports have grown by 138% from 1973-2000, while lumber production in Japan has declined by 61% over the same period.

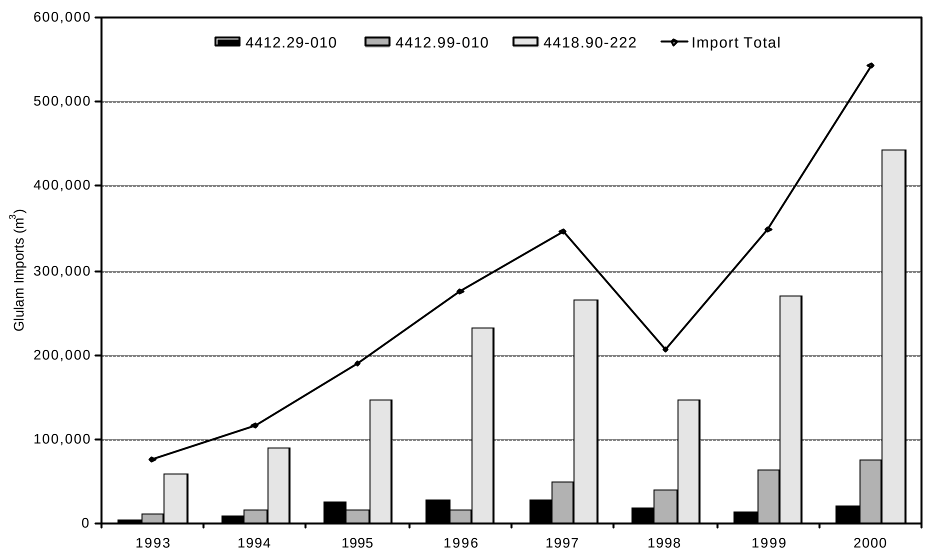


Figure 6-15. Japan Imports of Glue Laminated Timber by Product.

The import data clearly show that since the mid-1990s, European suppliers have displaced US and Canadian suppliers in the Japanese market. Many industry observers have attributed this to a combination of factors, including a favorable Euro/yen exchange rate relative to the US and Canadian currencies, artificially low transportation rates, and a high quality product with a light color and good appearance. In addition, many manufacturers may have decided to shift some of their production to the strong US market, essentially de-emphasizing their focus on the Japanese market. However, as much as low price and good quality might have helped, several industry observers in Japan have indicated that the Europeans have worked hard to penetrate the Japanese market by going around the traditional import channels and selling directly to the end-user (including glulam manufacturers, precutters, and home builders). They have also been willing to ship small volumes of specialty products to new customers in rural areas (a risky venture) in an effort to develop a relationship with key customers. To the extent that these relationship and service factors have been important contributors to the European success, we would be wise to explore the role of these factors further.

There can be little doubt that, given the immediate impact of the regulatory changes in the housing sector (HQAA and the 10-year Housing Warranty), the mix of products and species is changing rapidly. The market is shifting to using kiln-dried lumber, which has displaced hemlock to a large extent due to the difficulty of drying this species. A similar process may be happening with sugi as well for the same reasons. Demand for yellow cedar and treated lumber in ground sill (*dodai*) applications has also increased as a result of the 10-year Housing Warranty. In addition, the increased role of the precutting industry has helped stimulate demand for glulam timber.

CHAPTER 7. SUBSIDIES AND SUPPORT PROGRAMS IN THE FOREST SECTOR

BACKGROUND: JAPAN'S FORESTRY AND WOOD PRODUCTS POLICY

The Japanese Ministry of Agriculture, Forestry and Fisheries, Forestry Agency has described Japan's forest environmental problem as a situation where too few trees are being harvested. (Ministry Interviews: 1998, 1999, 2001) The result of this under-utilization is a growing inventory of under-managed fiber in Japan's national and private forests. There are several reasons for this under-utilizations including declining profitability, an aging forestry work force, a decline in the number of wooden homes versus non-wooden homes being built, and the general lack of competitiveness of the domestic forestry and forest products industry compared to international suppliers. The combination of these factors has resulted in a growing "wall of wood" as the incremental increase in the volume of standing timber exceeds harvest rates. From the mid 1990s the Japanese budget and the forest policies administered by the Forestry Agency have tried to address these problems. Through its policies the Government of Japan has been attempting to realize "an era of domestic timber" by creating the market demand-pull necessary for more intensive management of its forests.

There have been long periods in Japan's forestry and wood products policy history when budget allocations clearly reflected a wood production oriented stance. From the post-war years through the 1970s, domestic forest policy was oriented primarily to supporting and supplying wood to of the fulfill the demand for housing. This policy began to shift in the 1970s and it was been overhauled in the late 1990s to match public opinion and to tackle the decline in competitiveness of Japan's forestry and forest products sectors. Table 7-1 is a chronology of Japan's forest management policy changes from the 1940s-1990s.

Table 7–1. Japan's Forest Policy Shifts in the 20th Century.

Period	Policy Action and Effect
1940 – 1950:	Reforestation to recover forest land devastated by over-harvesting during the war
1950s (Latter half)	Shift from simple recovery and rehabilitation to enhancement and expansion of fiber resource in order to increase wood production
1960s (Latter half)	Qualitative improvement, enlargement of watershed forests
1970s	Public backlash, more nature protection, recreational function of forests added to wood production focus
1980s	Increased diversity of forest management from a single-story and wood production focus to multi-story management and diverse functionality of forests for public benefit
1990s	Watershed management, erosion, habitat conservation, diversity of species, sustainability issues, wood promotion and distribution

Sources: JAWIC and MAFF, Forestry Agency

Recent shifts in Japan's policy towards forestry and forest products address the following issues:

1. Public perception changes and the newly articulated objective of a forest policy to achieve social and public benefit. (Table 7-2)

   The Japanese public's expectation of their forests has changed dramatically during the post-war period. According to the Prime Minister's public opinion survey, in 1980 the Japanese public expectation of the forest resource contribution to wood production was 55%. This expectation of the forest to service the wood industry declined to 13% by 1999. (See Table 7-2 on the changing public perception of the role of forest.) To address these expectations, the utilization of forests for recreation, for headwater conservation and protection has been a key feature of Japan's forest policy in recent years. Over one-third (approx. 8.8 million hectares) of Japan's forest area is now designated as protection forests for the purposes of headwater conservation, soil erosion and other protection. It is a specifically stated objective that most of the national forests are to be used to serve this public benefit rather than as a source of wood supply.

2. Forest policy addresses the aging forestry labor force and the loss of the rural/forest based population due to a lack of forestry and wood processing employment opportunities.

One of the most important public and social benefits touted by the Government of Japan in its forestry policies is that a revitalized forestry sector will maintain employment in upstream villages where the forestry and timber dependent workforce is decreasing through aging. For example, direct subsidies to improve wood processing facilities and forestry dependent village infrastructure are available. Various industries, from traditional forestry to non-timber forest products, are supported and promoted by a diverse menu of programs in villages and hamlets. Production of non-wood forest products, such as charcoal and the gathering of numerous kinds of edible mushrooms, is a valuable source of income to these forest-dependent communities. Non-timber forest product activities are encouraged and supported through government policy. In 1988 the value of non-timber forest products in Japan was ¥347.4 billion, almost double the dollar value of all US solid wood exports to Japan during the same year.

Table 7–2. Changes in Public Perception of the Role of Japan's Forests.

Order	1980		1986		1993		1999	
	Role	**%**	**Role**	**%**	**Role**	**%**	**Role**	**%**
1	Disaster Prevention	62	Disaster Prevention	70	Disaster Prevention	65	Disaster Prevention	56
2	Wood Production	55	Headwater Conservation	49	Headwater Conservation	59	Headwater Conservation	42
3	Headwater Conservation	52	Air Purification/ Noise Reduction	37	Wildlife Habitat	46	Global Warming Mitigation	39
4	Air Purification/ Noise Reduction	37	Wood Production	33	Air Purification/ Noise Reduction	38	Air Purification/ Noise Reduction	30
5	Health and Recreation	27	Health and Recreation	25	Wood Production	27	Wildlife Habitat	26
6	Forest Products	19	Outdoor Education	21	Outdoor Education	14	Outdoor Education	24
7	Other	0.3	Forest Products	12	Health and Recreation	14	Health and Recreation	16
8			Other	0.0	Forest Products	12	Forest Products	15
9					Other	0.3	Wood Production	13
10							Other	0.2

Source: *Prime Minister's Office public opinion poll on forests and forestry. 1980, 1986, 1993, and July 1999. Taken from Forestry Agency's Annual Report on Trends in Forestry, FY99.*

3. Policies to counter the loss of domestic wood competitiveness resulting from losses in the share of wooden homes and imports. Thinnings and forest management are no longer demand driven.

The public backlash to forests being utilized largely for wood production roughly parallels the declining role wood has played as Japan's main residential construction material over the past 20 years. In 1980 60% of all housing starts were constructed of wood, yet by 2000 45% of Japan's home were built of wood (See also Chapter 1 of this report). This share loss and its concomitant impact on wood demand and rise in wood imports over the decades has contributed largely to the shape of present government policy. As late as 1997 the Forestry Agency noted: "The main reasons for the declining financial state of the National Forest Operation were the stagnant timber prices caused by increased wood imports following trade liberalization and the diminishing profitability of timber production caused by the increasing management cost, notably wages" (Annual Report on Trends of Forestry; Forestry Agency, FY 1997). Forest management in Japan is no longer demand or market driven. A key component of Japan's forest policy is the promotion of thinning in spite of lack of profitability of forestry. *The recently formed policy takes advantage of the demand for multi-functionality of the forests and their sustainability for multiple uses; for wood production and to enhance the forest function for the public's benefit.* Some examples of measures taken include promoting thinning, improving forest roads and utilizing small diameter timber in soil erosion projects that result from the thinning operations.

One major step to achieve the government's dual objectives of achieving a greater public benefit from the forests and maximizing forest management activities to take full advantage of the domestic wood supply, was taken by the Government of Japan in 1998 when it reformed its national forest operations through the adoption of the Law of Special Measure for the National Forest Operation Reform. The basic policy direction enacted by this law was to reform national forest policies with implications for private forest management as well. The following outlines these policies:

Reform policies for national forests:

- To be managed for public benefit. The area of national forests managed for public benefit increased in area from 50% to 80%.
- To restructure the national forests through improved management systems. Cutting, planting and silvicultural operations managed by private contractors exceeded 70% in 1998.
- To restore fiscal soundness: ¥2.8 Trillion in the Forestry Agency accumulated debt was transferred to the general national account in 1998.

Application to private forests:

- Forestry activity on private forests should also conform to environmental protection objectives.

Since these policy reforms essentially placed most of the national forests, now designated as “the people’s forest”, in the public domain, much of the timber harvests and intensive "management for profit" activities are occurring on private lands (60% of Japan's total forest area).

The land area in national forests that were dedicated to timber production in 1998 fell from 54% to 19% and private forest land became more important than ever as a domestic timber source. The area of forests in national forests that were managed for the public benefit consisting of “watershed forests and land conservation” and for “forests for harmonization between humans and nature” was expanded from 50% to 80% of the total forest area. Private industry is the beneficiary of these reforms since it focuses on private forest economic objectives. In addition, the private forestry industry benefits by securing contracts for harvesting, planting and silvicultural operations on national forests, which is a goal explicitly stated in the national forests Operation Reform. Programs set in place designed to strengthen the domestic forest industry include: encouraging log harvest by owners, facilitating log production and distribution, gaining efficiency improvements through the mechanization of operations and encouraging the collaboration and efficiency between owners by stepping up forestry owner cooperative efficiencies.

Harvesting goals for both private and national forests include:

- Maintaining quality through more intensive management
- Cultivation of multi-story forests through more thinning
- Effective utilization of the small diameter resource, such as erosion and disaster prevention using small diameter logs from thinning operations
- Stabilizing quality and supply volumes to domestic mills
- Increased cost competitiveness against the threat of imports

A key goal of the Forestry Agency’s policies is to rationalize domestic wood manufacturing and distribution. Programs to develop new products and improve processing technology play an important role. The development of kiln-drying technology and equipment disbursement through direct subsidies and low-interest loans is a priority of the plan.

DIRECT GOVERNMENT SUBSIDIES

The Government of Japan has historically dedicated large portions of its budget to support the forest sector. To achieve the new objectives described above the Government of Japan will continue to support the sector primarily through the Forestry Agency. Last year the budget of the Forestry Agency was over ¥500 billion. Of this, approximately 33%, or ¥167 billion, was classified as subsidies in the Forestry Agency budget. These expenditures are targeted for forestry research, disaster expenditures, road development, wood processing equipment, promotion and other programs. The subsidies fall under a variety of accounts the largest of which are the Forest Protection Expenses and Forest Products Industry Promotion expenses. Forestry owner cooperative associations are the leading recipients of these monies.

Table 7-3. Forestry Agency Subsidy Budget, FY 2000 by Project Code.

Budget Code	Project Name	Funding (Billion ¥)
102	Forest Products Industry Promotion	41.728
105	Forest Protection	81.478
	Afforestation	30,923.000
	Road Construction and Maintenance	38,971.000
	Other Management	8,145.000
106	Forest Environment Maintenance & Development	23.079
107	Forest Road Maintenance & Construction	3.492
108	Japan Green Resources Corporation (formerly Forest Resource Development Corporation)	16.212
109/110	Forest Facility Disaster Recovery and expenses	5.471
Total:		¥167.812

Source*: Ministry of Finance – National Accounts, 2000.*

FORESTRY SECTOR SUBSIDIES

Over 75% of all subsidy monies (Budget Codes #105 – 110) target the forestry sector rather than wood processors. Strictly speaking, these budget categories are classified as Public Works and as such, they are meant to benefit the public rather than industry. However, since these subsidies essentially reduce the cost of timber, it can be argued that the bulk of the subsidies are still oriented toward increasing domestic wood utilization and toward realizing the Forestry Agency motto of "an era of domestic timber". Therefore, the subsidies should be included in any discussion of overall subsidies to the wood products industry.

FOREST OWNERSHIP AND IMPLICATIONS FOR SUBSIDY ALLOCATIONS

Forest ownership as shown in Table 7-4 has a significant impact on how Japan's forests have been managed and where the subsidy allocations are targeted by the Forestry Agency. As was described earlier in this report, 90% of Japan's forestry activity is conducted by, or on behalf, of forestry households, the vast majority of which are small-scale, and increasingly absentee, forest owners who own less than five hectares. Since many private landowners are not adequately managing their forest land due to poor profitability, forest owner cooperative associations carry out thinning operations and management on behalf of the individual private owners. Forestry owner cooperatives are associations consisting of forest owners, who together own about 70% of non-national forests. The cooperative associations conduct 80% of silvicultural work and 70% of thinning operations in non-national forests. Such owner cooperatives carry out joint silvicultural operations, training and securing a contractor work force, and jointly acquire forestry machinery. It is the forestry owner cooperative associations that are the overwhelmingly largest and direct beneficiaries of the subsidy monies. The cooperatives are being encouraged by the government to consolidate and merge in order to streamline management and achieve a rational operational scale. There has been a steady decline in the number of forest owner cooperatives over the past decade, illustrating the success of this encouraged consolidation. The cooperatives are seen as the primary means to increase the productivity of the private forests in Japan.

Table 7–4. Forest Ownership.

Ownership	Area (Million Hectares)	Percentage of Total Forest Area
National Forest	7.85	31%
Private	14.57	58%
Local/ Pref. Government	2.73	11%
Total	**25.15**	**100%**

Source*: MAFF, Forestry Agency*

WOOD PROCESSING SECTOR

About one-fourth of the direct subsidies goes toward Budget Code 102, which is titled "Forest Products Industry Promotion". Forest Products Industry Promotion (Budget Code #102) is defined as a “non-public works” subsidy. It is therefore targeted to promote and support the domestic forest industry. However, recipients for these grants include prefectural governments and municipalities who may disperse the monies regionally to local industry. Forestry and other cooperatives are the largest recipients of these grants.

Table 7–5. Recipients of Forestry Agency Grants (Non-Paper) for Wood Processing.

Recipients	FY 1997 (Unit: Million ¥)	FY 1998 (Unit: Million ¥)	FY 1999 (Unit: Million ¥)
Prefectural Governments	1,575	1,404	1,182
Industry Federations, Central Organizations	1,634	2,246	2,149
Municipalities	703	1,030	2,636
Other orgs: Forestry Cooperatives, agricultural cooperatives, wood product manufacturer cooperatives	6,467	5,462	4,235
- Forestry	1,286	1,357	1,170
- Wood product manufacturing and wood products use	3,609	2,509	1,599
- Non-wood forest products sector (eg: Mushrooms)	1,573	1,595	1,466
Total:	10,379	10,141	**¥10,201**

Note: The above figures summarize the grants related directly to manufacturers of forest products and was provided by the Forestry Agency.

These grants are provided with a view to:

1. Alleviating geographical/social disadvantages within rural areas and promoting those economies and Encouraging the use of wood products especially within those areas.

2. These grants are provided to recipient organizations if these organizations are determined to undertake specific projects prescribed in the respective subsidy programs. However, these subsidies granted do not cover all costs/expenses necessary to implement the specific projects.

Table 7–6. Grants Related Forest Products Manufacturing (Non-paper).

Budget of Forestry Agency	FY 1997 577,610 Million ¥)	FY 1998748, 798	FY 1999 677,045
Wood Products manufacturing related grants (disbursed)			
Promotion of Forestry Production and Forest Products Marketing	5,856	5,723	5,118
Infrastructure for Forestry Production and forest products marketing	3,926	3,865	4,662
Stabilization of supply and demand for wood	608	554	421
Total:	10,379	10,141	**10,201**

Table 7–7. Loans Made by Agricultural, Forestry and Fisheries Finance Corporation.

Classification	FY 1997		FY 1998		FY 1999	
	Contracts (#)	**Amount** (Million ¥)	**Contracts (#)**	**Amount** (Million ¥)	**Contracts (#)**	**Amount** (Million ¥)
Total:	19,890	421,680	17,425	434,424	17,729	415,244
For Forestry Related Sector	1,472	48,789	1,371	47,069	1,307	44,170
For Wood Processing Equipment and Wood Distribution Equipment*	96	7,113	92	8,098	52	4,614
For Pre-cutting Equipment**	16	1,697	16	1,040	8	527

Source: Ministry of Agriculture, Forestry and Fisheries: Forestry Agency
Note*: * Land, building, office, machinery, vehicle, etc.*
*** Includes related facilities such as saw-milling machinery.*

Representative wood product assistance programs administered under the Forestry Agency, Forest Products Division are:

- Kiln-dried Wood Stable Supply System Development Program
- Wood Demand Expansion Program
- Wood Use Promotion Program
- Wood Products industry Development Promotion Program
- Log Producers Foundation Strengthening Promotion Program
- Thinned Wood Construction Use Technology Development Program
- Wooden Construction Fire Resistance Evaluation Program
- Wood Use Technology Development and Promotion Program
- "Timber Engineer" Nurturing Program
- Regional Wood Use Promotion Program

For more detail see Appendix G

There are many categories in the support programs that include a great deal of complex detail. Further research is warranted to determine the extent of the benefit to the industry.

CONCLUSIONS

Areas of Mutual Benefit

The stated intention of many Forestry Agency policies, including the specific Forest Products Promotion Budget and the Forest Products Division assistance programs, is to increase the use of domestic timber and to stop the continued slide in the wood house market share. Promoting the use of wood in housing is important to both domestic and foreign forest product suppliers. Though these Forestry Agency programs are intended to promote the use of domestic wood, the effort to encourage builders and consumers to continue to use wood in residential construction and to bolster the share of wood home construction in Japan is mutually beneficial to all suppliers of wood in that market. The measures of the new plan that are beneficial to all wood products, domestic or imported, are features intended to: 1) increase the utilization of wood, and 2) take advantage of the environmental and health benefits that have been attributed to wood.

Impact on Trade

The recent Forestry Agency's *Basic Plan* package of subsidies and support programs were put into place to: 1) Change the role of Japan's forests to provide more public benefit, and to, 2) Ameliorate the difficulties of the forestry and wood processing sectors caused circumstances that have made them less competitive than foreign suppliers, such as an aging work force and emigration from rural areas. Therefore, it could be argued that these policies could have grave implications for trade and that support for increasing the utilization of Japan's domestic forest stock through increased use of domestic timber would negatively impact imports. However, although the policies have been altered in the last five years, and they include policies to increase the public's access to national forests, the government's historic support of the forest industry remains the same. Many of the support programs, such as loans and grants to provide processors with kiln-drying equipment, support for pre-cutting programs, the creation of more rationalization programs through Rationalized Systems Certification (HOWTEC), and other programs, are targeted at responding to a performance-based regulatory environment that was introduced internally. Looking at the history of Japan's government assistance programs it can be observed that these programs, particularly the new ones implemented in the last five years have not caused any perceptible change in the overall wood self-sufficiency rate, with the exception of 1998 when the Forestry Agency announced that their domestic species utilization policy was working as wood self-sufficiency increased by 1% to 21%. The objectives of a domestic wood utilization centric policy have long been in place. Perhaps the largest impact of policy in having to try to meet the public's demand for diversified forest functions and to place an increasingly larger area of the national forests as protection forest area, is that the private contractors and cooperatives have benefited and rural employment is maintained. That these programs have contributed to an overall increase in efficiency or to a strengthening of Japan's forestry and forest products' competitiveness position is doubtful. Trade impacts, as measured in domestic wood market share increases, have yet to be felt.

CHAPTER 8. TRADE RESTRICTION AND ITS IMPACT ON THE JAPANESE MARKET

This section provides a trade analysis of Japan's competitive position to produce and consume softwood lumber and how trade restrictions might affect the domestic industry and consumers of wood products. The presentation is divided into five sections. The first section briefly summarizes Japan's demand for wood products. Section 8.2 describes how Japan has historically met the demand for wood products. The next section discusses the domestic capacity to produce wood products and its cost structure. An analysis of the trade restriction and the trade liberalization policies is presented in section 8.4. Conclusions are given in section 8.5. The first four sections describe market parameters for timber, processing and consumption of forest products and trade. These sections describe key economic variables used to analyze the trade restriction and trade liberalization policies with an economic model of forest products trade. The relationship among economic variables describes Japan's overall competitiveness in producing softwood lumber and the effect potential trade restrictions might have on the sector.

INTRODUCTION: JAPAN'S DEMAND FOR WOOD PRODUCTS

Housing is a key economic driver for forest products consumption in Japan. Japan's housing sector is a significant end-use of wood products, whether wood is used in the construction of non-wood structures or as building materials in wooden family dwellings.

Japan has one of the highest population densities and some of the highest land prices among the advanced countries of the world. The average house in Japan is less than two-thirds the size of average sized home in the United States; and on a per capita basis, Japanese homes have half the living space. The average size of Japanese owner-occupied single-family homes is 139 m^2 (Ministry of Construction, 2001). Wooden structures average 112 m^2 (MAFF 1999).

Historically, most wood frame homes in Japan were post and beam construction, built without nails, and with the wood structural members unpainted to expose their texture and grain--a feature that is highly valued in Japan. As mentioned earlier in this report in 1963, post and beam construction represented 86.2% of all residential housing starts. By 2000, however, post and beam construction represented one-third of all new residential housing starts, giving way to 2x4 construction and non-wood construction such as steel and concrete (JAWIC 2001).

The Japanese government plays a major role in stimulating housing construction. Government assistance usually takes the form of financial incentives such as low-interest loans and tax incentives. The effect of government policy is that the proportion of personal income invested in housing in Japan is much larger than the proportion invested in the US. From 1960 to 1987, the proportion of personal income invested in new housing and additions and alterations of existing housing averaged 6% compared to 4.3% in the United States (Villanueva, 1988). Increases in Japanese housing construction in the 1960s and early 1970s averaged 9% a year. Figure 8-1 indicates five distinct stages of growth from 1960 to 1999. From 1960 to 1973, the Japanese economy grew at an average rate of 16.2% and construction's share of the GNP increased from 15.1% in 1960 to 24.6% in 1973. In 1973 to 1979, the worldwide oil crisis affected the growth in construction investment, which grew at an 8.9% rate during the period. The second oil crisis occurred in late 1978, precipitating what was the longest recession of the postwar period of the Japanese economy from 1979 to 1985. Government policies to stimulate consumer spending and domestic demand helped end the recession. During the last part of the decade, housing starts per capita exceeded the United States as poor quality housing built after the war was replaced and consumers developed the desire and the means to improve their living conditions brought about by the strong economic growth of the past 30 years. In 1993, Japan constructed 12 housing units per 1,000 persons compared to 5.1 in the United States. However, Japan's prosperity changed dramatically in the nineties. The economic bubble burst and the Japanese economy returned to stagnant growth. The 1997 collapse of Asian currencies and failure to recover has kept the Japanese stagnant for the last 5 years.

The projection of housing is a key parameter in CINTRAFOR Global Trade Model (CGTM) and for the trade analysis that follows. For this study we assume that housing starts will remain constant over the next ten years, even though likely intervention by government policies will influence the actual number of starts. Holding demand for lumber constant when analyzing the effects of tariff increases will not affect the general results of the analysis, however, and simplifies the task at hand.

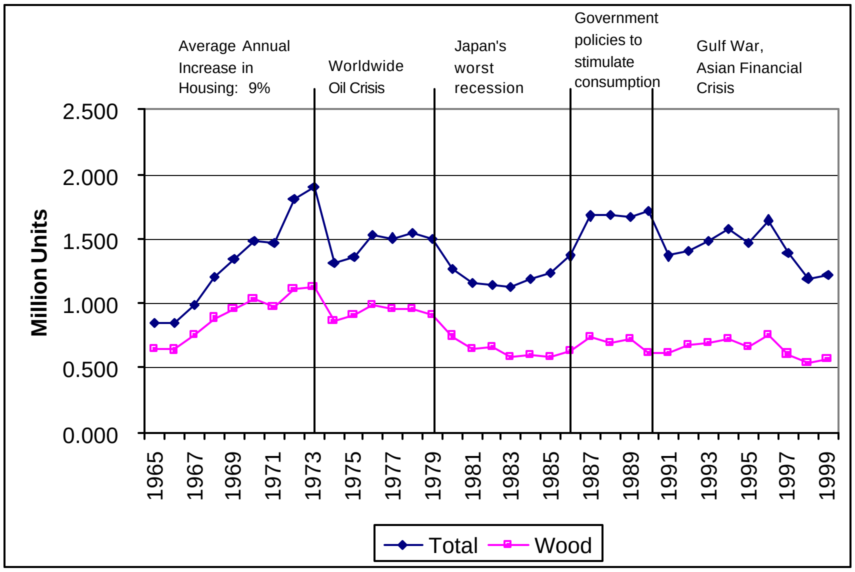


Figure 8-1. Housing Starts in Japan.
Source: Japan Lumber Reports (various issues)

MEETING THE DEMAND FOR WOOD PRODUCTS

While the housing sector largely drives Japan's demand for wood products, how Japan has met that demand has changed dramatically over the past four decades. We begin by describing Japan's ability to produce timber as a raw material for its own domestic consumption. This discussion provides information about Japan's own timber resources, its development over the past four decades and its economic relationship with wood processors on the islands. Economic costs are described. We then introduce log imports and how they have provided Japan's wood processing industry with a lower cost option. Finally, we remark on the structural changes in the 1990s that have changed how log imports are used to produce lumber products in Japan.

Timber growing stock is the inventory of raw material suitable for producing lumber and other products. In Japan, the growing stock has been expanding over the past four decades. In 1966 there were an estimated 1.9 billion cubic meters of growing stock in private and national forests. By 1995, the growing stock had expanded to 3.5 billion cubic meters. Based on the data below, growth is estimated at around 60 million cubic meters per year, Table 8-1.

Table 8-1. Timber Growing Stock in Japan (million cubic meters).

Year	Total	Private Forests			National Forests		
		Private	Public	Private Total	Forest Agency	Others	National Total
1966	1,888.000	803.000	167.000	970.000	899.000	19.000	918.000
1971	2,080.000	1,033.000	191.000	1,224.000	835.000	21.000	856.000
1976	2,186.000	1,184.000	197.000	1,381.000	783.000	22.000	805.000
1981	2,483.000	1,449.000	231.000	1,680.000	781.000	22.000	803.000
1986	2,862.330	1,751.830	280.486	2,032.316	808.329	21.685	830.014
1995	3,483.234	2,212.102	359.064	2,571.166	892.456	19.612	912.068

Source*: Forest Agency (1987) Nihon no shinrin shigen, Nihon Ringyo Gijutsu Kyokai; Forest Agency (1995) Shinrin shigen genkyo.*

While harvest and delivery costs for most wood producing countries have been constant in real terms, Japanese mills witnessed a substantial increase in harvesting and delivery costs during the 1980s (Figure 8-2). These costs are now nearly three times more than those in the Pacific Northwest (PNW) region and six times larger than those in Scandinavia and the southern hemisphere. Imports from the US increased as Japanese consumers sought high quality, lower-cost logs. Stable freight rates from North America maintained imported prices attractive (Table 8-2).

Excess wood supplies in the PNW provided a cheap supply of raw materials for Japan. The infamous Columbus Day storm of 1962[2] created a glut of timber in the US and opened the Japanese market for US log exports. Subsequently, hemlock logs, previously used by pulp mills in the US, were exported to Japan where their physical characteristics were much appreciated by Japanese consumers. Japanese logs were replaced with US logs as US logs were supplied at a lower price than domestically produced logs. Low shipping costs from North America helped foreign products compete.

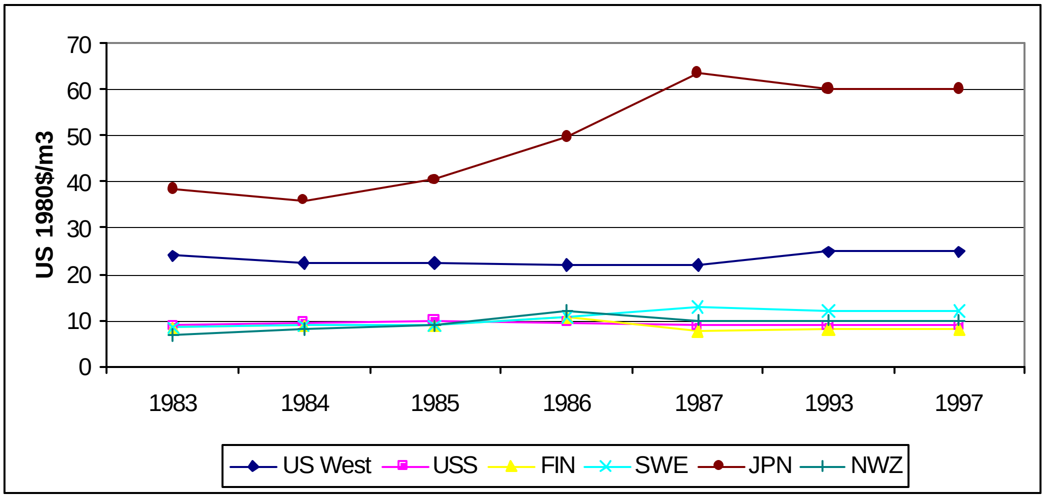


Figure 8-2. Harvest and Delivery Costs for Softwood Logs Delivered to Local Mills.
Source: CINTRAFOR; Preliminary estimates for 1993 and 1997

Table 8-2. Freight Charges from 1993 to 2000.

Year	Cost /ton (Yen)
1993	600,000
1994	600,000
1995	615,000 to 780,000
1996	680,000 to 770,000
1997	660,000
1998	580,000 to 630,000
1999	530,000
2000	480,000 to 600,000

Source*: Japan Lumber Reports (various issues)*

2 The Columbus Day storm was a climatic event that leveled many acres of timber. It is "unofficially" credited with creating a surplus of timber that domestic mills could not process and hence gave impetus to log exports to Japan. There are many people in the region that still remember the event and is recalled often when the history of log exports from the region is discussed.

In the PNW, logging and harvesting costs began to rise during the 1990s due to new environmental regulations (Figure 8-2). Despite higher prices for raw material exports in the PNW, Japan's high harvesting and delivery costs continued to be uncompetitive against log imports from this and other regions. The housing sector continued to rely on foreign sources of raw materials due to the lower cost of imported logs, their higher quality, the higher utilization rates obtained by Japanese sawmills and in spite of trade barriers for imported mill products and an expanding domestic timber stock.

Figure 8-3 depicts log consumption for softwood lumber production during the last three decades. Both domestically produced and imported logs are shown. Since the mid 1970s domestic consumption of logs has been declining steadily. The collapse of several exchange rates for Asian currencies, which lead to the collapse of Asian economies in 1997 and the subsequent recession in Japan and its housing sector caused domestic production to drop to below 15 million cubic meters for the first time in the past three decades.

Japan has met its excess demand for lumber through log imports, primarily from the US, Russia, and the southern hemisphere. As marginal producers, the volume of imported logs used by domestic mills fluctuates with changes in market conditions. Figure 8-4 illustrates how the consumption of imported logs tracks wooden housing demand.

The previous discussion about the availability of logs for industrial use, their harvest and delivery costs, and the international log trade provides data used in modeling the production, consumption, trade and prices of wood products with the global trade model. The model utilizes the information on available inventory, growth on inventory, the price responsiveness of timber owners, cost of producing and transporting raw materials to determine markets shares across the globe. Before turning to a discussion of the trade model and how tariffs might affect trade in forest products, we describe the saw-milling sector.

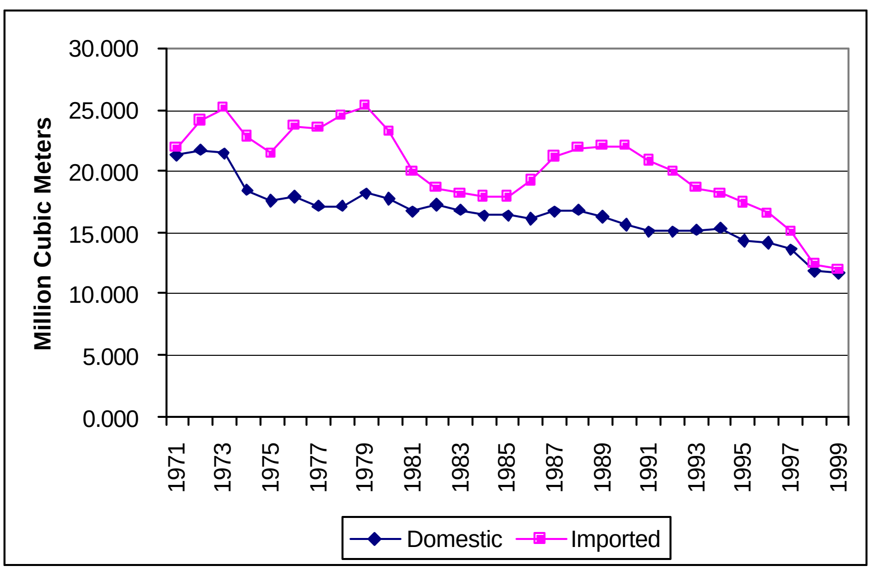


Figure 8-3. Log Consumption for Softwood Lumber Production
Source: Japan Lumber Reports (various issues), CINTRAFOR

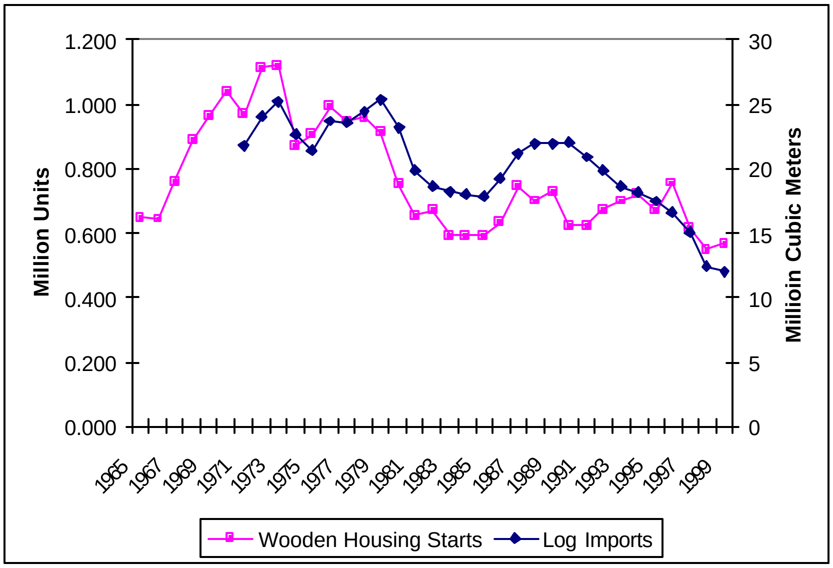


Figure 8-4. Japan's Wooden Housing Starts and Softwood Log Imports.
Source: Japan Lumber Reports (various issues); CINTRAFOR

JAPANESE CAPACITY TO PRODUCE SOFTWOOD LUMBER

As in the case of sawmills, Japanese consumers of processed wood products (contractors, homebuilders and others) have the option of using imported products or comparable domestic products. Their purchasing decision relies on several factors including price, availability and quality. In this section, we examine the ability of Japanese sawmills to produce competitively priced materials by examining their costs associated with the manufacturing process.

The major cost that a sawmill faces is the log cost. Imported logs were competitive with domestic logs and imported lumber until the 1990s. During the 1990s environmental restrictions affected timber harvests in the US and imported log costs increased substantially, forcing many sawmills in Japan to shut down (Figure 8-5). Higher log prices forced consumers of wood products to search for alternative suppliers. In many cases, rather than use high priced domestic logs to produce processed products, consumers began to use imported processed wood products. Many of these imported products have a lower production costs associated, which makes them more competitive with products produced in Japan. The reduced demand in Japan associated with the Asian economic crisis has brought log prices down in recent years, but the lower available supply of logs in North America due to increased environmental restrictions has led to a change in preference in Japan for processed wood products.

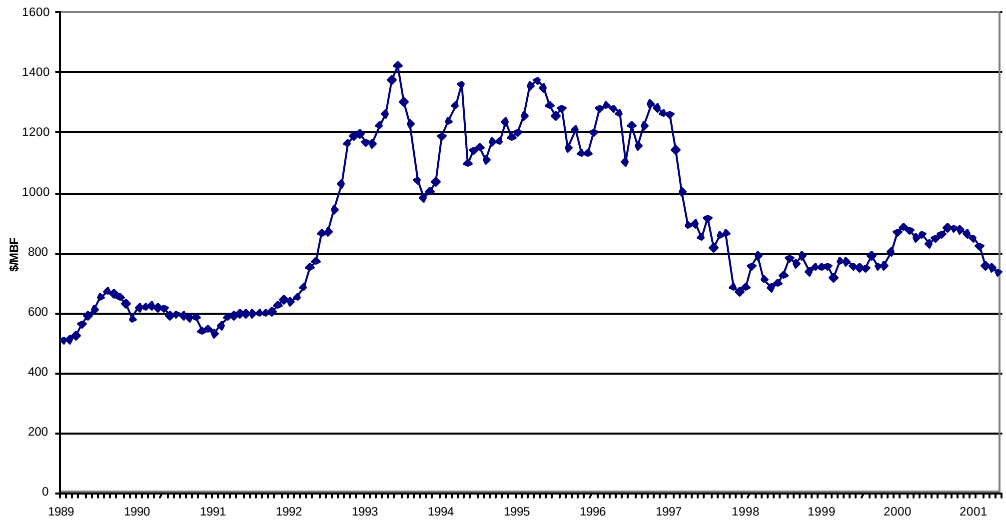


Figure 8-5. Log Prices for Douglas-fir Logs from Washington.
Source: Log Lines

Aside from rising log costs, the operating costs associated with maintaining the mill in operation, such as labor and energy, are also important in determining the price of processed wood products. The productivity of sawmills—how much of the log is converted into useful product—also affects a mill's cost recovery. All these factors contribute to the competitive position of Japanese sawmills. In the following paragraphs we will discuss the minimum manufacturing costs associated with Japanese sawmill.

We start with log conversion. From 1985 to 2000, log conversion rates have declined and now 5.5% more logs were used to produce a unit of lumber in Japan than in 1985 (Figure 8-6). Economic instability is likely to have caused the variation observed since 1997. A search for new log sources caused by limited supply due to the environmental restrictions in the US and tropical countries initiated the rise in log input requirements per unit of lumber output in 1993. The transition from old-growth log imports from the US and tropical countries is also likely to be near its end indicating that the log input per unit output is not likely to continue to rise as dramatically as it has over the past 15 years.

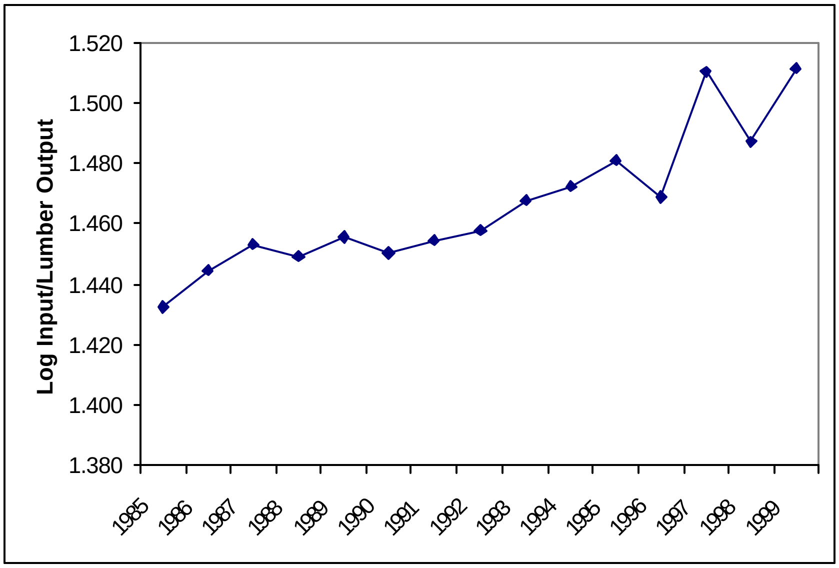


Figure 8-6. Japanese Sawmill Use of Log Inputs.
Source: Japan Lumber Reports (various issues) and CINTRAFOR

Energy is another important operating cost for sawmills. Sawmill capacity in Japan is rated by the mill's electricity use. Electrical rates for the saw-milling sector in Japan are 3 to 4 times higher than other producers, according to OECD International Energy Agency data (Figure 8-7). The high cost of energy contributes to the uncompetitive nature of Japanese producers of lumber.

While Japan's wage rate was competitive during the 1970s and early 1980s, wages sharply increased following Japan's economic recovery during the late 1980s. The Asian economic crisis appears to have interrupted the wage rate increase, however. Since then, Japan's wages have been on par with the US. While Japan's sawmill laborers are paid higher wages relative to southern hemisphere producers, they receive lower compensation than European producers (Figure 8-8).

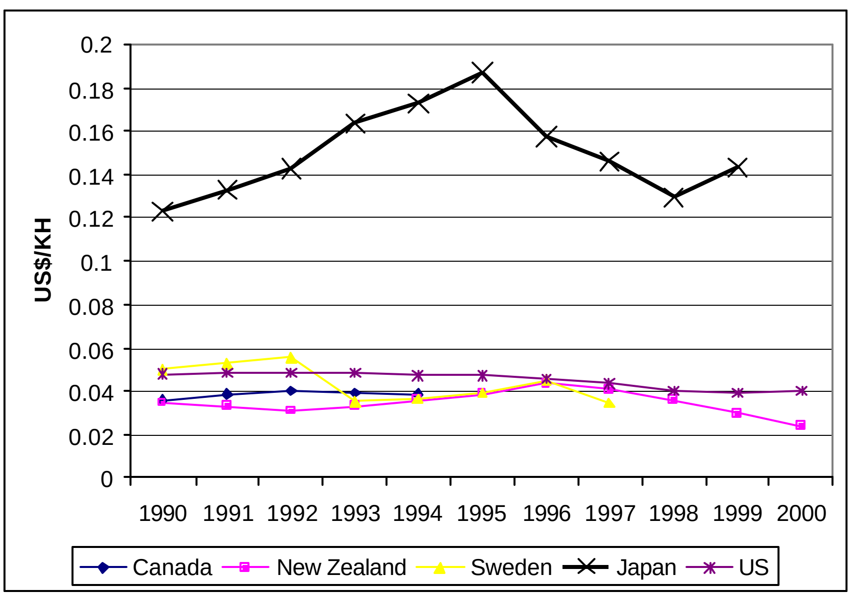


Figure 8-7. Electricity Rates for Saw Milling Industry by Selected Countries.
Source: OECD (2001).

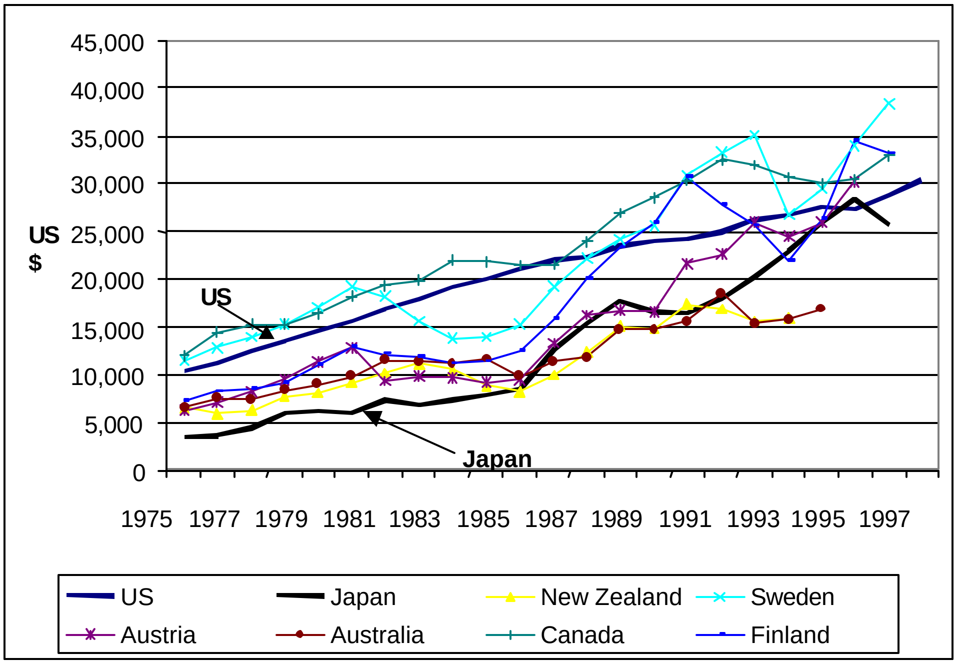


Figure 8-8. Labor Compensation for Selected Countries in SIC 24: Sawmilling Industries.
Source: OECD 2001

The previous charts showing imported log prices, energy and labor costs combined with a decreasing log processing efficiency indicates that Japan's sawmills are high cost producers of lumber relative to their competitors. The recent recession brought about by the Asian economic crisis has lowered world consumption of wood products worldwide. Combined with the environmental restrictions in Japan that have limited the supply of timber, the Japanese economic downturn has created a situation where excess manufacturing capacity exists. Lower demand and excess manufacturing capacity has more effect on the competitiveness of high cost producers, such as Japan, than on lower cost producers, such as those in North America, Scandinavia, and the southern hemisphere.

The trade model considers minimum manufacturing costs, conversion efficiencies and existing saw-milling capacity to determine trade flow patterns. These processed wood market parameters are combined with the log market parameters to simulate changes in production, consumption, trade and prices for log and mill products. We now turn to the analysis of trade policies with the CGTM.

AN ANALYSIS OF TRADE RESTRICTIONS

This analysis utilizes the CINTRAFOR Global Trade Model (CGTM), Cardellichio et al., 1989) to measure the effects of trade restrictions and trade liberalization on Japan's saw-milling and forestry sectors. The modeling approach holds demand and supply parameters constant across the globe while adjusting trade costs, then measures the changes observed in production, consumption, trade and prices. The demand scenario assumes wooden housing starts of 600,000, which are held constant to 2010. Softwood timber inventory is estimated at 2 billion cubic meters. Annual growth on this inventory is estimated at 25 million cubic meters. Japanese production capacity is allowed to respond to changing supplies of domestic and imported logs. Trade costs on all softwood lumber trade flows to Japan were increased at 5% increments until imports were reduced to zero to analyze the potential Safeguard Action.[3] A trade liberalization scenario reduces trade costs by 4.5% on all lumber product imports to Japan. The simulations began in 1993 and were completed by 2010. Trade policies were implemented in 2000.

Measures of changes in lumber imports, domestic lumber production, log imports, domestic log production, lumber prices, log prices, and the gains/losses to timber owners, sawmill operators and lumber consumers are reported in Table 8-3. The 25% tariff increase results in the elimination of all lumber imports to Japan, while tariff liberalization increases lumber imports by 26%.

[3] Even though safeguard actions against leeks are 200%, the study uses an incremental approach to define the tariff rate that results in zero lumber imports. In the case of lumber, this tariff rate is 25% suggesting that even small tariff increase will result in significant reductions in imports.

Table 8-3. The Effects of a Safeguard Action and Tariff Liberalization.

	A 25% Tariff Increase under Safeguard Action		A 4.5% Tariff Liberalization Policy	
Lumber imports	-100%		+26%	
Domestic lumber production	+20%		-5%	
Log imports	+44%		-10%	
Domestic log production	+7%		-1%	
Japanese lumber prices	+16%		-4%	
Japanese log prices	+7%		-1%	
Gains/Losses	**%**	**Net**	**%**	**Net**
Gains/losses to Japanese timber owners (US$)	+13%	$412 million	-2%	$80 million
Gains/losses to Japanese sawmills (US$)	+212%	$2.2 billion	-37%	$382 million
Gains/losses to Japanese lumber consumers (US$)	-12%	$3 billion	+2.7%	$600 million

According to the trade simulations, a 25% increase in tariffs under a Safeguard Action, causes a 20% increase in domestic lumber production and a 7% increase in domestic log production. Log imports increase by 44%. The reduction in lumber imports results in a 16% increase in Japanese lumber prices and a 7% increase in Japanese log prices. Both mill operators and timber owners increase their economic welfare. Japanese mill owners realize $2.2 billion dollars more under a Safeguard Action. Timber owner increase their economic welfare by less than $0.5 billion dollars. Consumers of lumber products lose approximately $3 billion dollars however. The loss to consumers is larger than gains to timber owners and wood processors.

Lacking a direct estimate of lumber us``ed in housing, we calculate it using several different approaches. Under these different approaches estimates of lumber use per house ranges from 21 cubic meters (m^3) to over 40 m^3. The variation depends on the data used to calculate lumber use. Using national lumber consumption estimates and dividing it by the number of wooden units built for the period from 1965 to1999, the estimated lumber consumption averages 43 m^3. This factor assumes all lumber is consumed by the home construction industry, however. The average lumber use per house is 40 m^3 when the national lumber consumption estimate is adjusted to 80% to reflect the portion of lumber used only in the construction industry over the past ten years. Another way to look at how much lumber is consumed in the housing sector is to use the average wood use per meter square of floor space, the average floor space and multiple it by the number of housing starts. MAFF estimates 0.191 m^3 of wood is used per square meter of floor space in wooden homes. Using the average 112 m^2 of floor space for wooden houses and the wood use per floor space conversion of 0.191, we estimate lumber consumption at around 21 m^3 per wooden house. Using this last approach suggests that only about 40% (11.6 MM m^3) of lumber is used in the construction of wooden houses.

The 16% increase in the price of lumber resulting from a Safeguard Action has the potentia l to increase home construction costs substantially. Using an average price for domestic products of 55,000 yen, (Japan Lumber Report 2001) and a midpoint estimate of lumber use per house of 30 m^3 (from above) a Safeguard Action results in an increase of 264,000 yen per house.

The trade liberalization policy increases the use of imported lumber in the Japanese economy. As a result, domestic lumber production declines by 5%. Imports of logs and harvests of domestic timber decline by 10% and 1% respectively. Because lower priced material is being used in Japan, the average price of lumber declines by 4%. Log prices also decline by 1%. Losses to timber owners are $80 million dollars; mill losses are $382 million dollars. Consumers gain $600 million dollars due to the lower lumber prices as a result of trade liberalization.

TRADE ANALYSIS CONCLUSIONS

Section 8 described the forestry and milling sectors in Japan and how the sectors compare to other regions using economic data. The data are then utilized in a trade model to describe how production, consumption, trade and prices are affected by alternative trade policies. A Safeguard Action imposes higher tariffs on lumber imports. The trade liberalization policy eliminates existing tariffs on lumber imports.

Potential Impacts on International Trade

A Safeguard Action results in substantial changes in trade flows. Lumber imports to Japan are eliminated, yet log imports are not. Rather, the lower priced log imports replace the majority of the lumber imports eliminated under a Safeguard Action. Hence, a Safeguard Action is likely to increase the use of imported log materials more so than use of Japan's own domestic resource.

The trade liberalization policy has only a small impact on the Japanese timber resource base. The gains observed by consumers ($600 million) are much greater than the losses incurred by timber owners ($80 million) and wood processors ($382 million).

This result from model simulations assumes that comparable log substitutes are available to substitute for lumber imports. The model simulations also assume that valued-added processing can be substituted with log imports. Both assumptions should be considered with caution because it implies that Japan can produce the kiln-dry material it is presently importing at a competitive price from imported logs and its own domestic resource.

Potential Impacts on Competitiveness

The tariff increase provides Japan with an edge in their domestic market. It is not sustainable however without maintaining the tariff in place. Hence a Safeguard Action affords only temporary relief from lumber imports. Preliminary simulations with the trade model suggest that removing the tariffs after a two-year period results in a dissipation of the gains to Japan from imposing higher tariffs. Further work in this area is needed to determine the extent to which tariff increases causes any permanent change in the competitiveness of Japan's forest sector.

CHAPTER 9. CONCLUSIONS

SUMMARY

Japan's forest sector faces several physical and structural challenges, most of which adversely impact the competitiveness of the forestry sector in general and the small private forest owner in particular. One of the most basic obstacles is Japan's geography. Many of the country's forests are located on steep terrain, which makes forest management challenging and increases the costs of building roads, harvesting, and transporting the logs from the forest. These high costs are further exacerbated by the fact that the majority of private forests are very small, which makes it difficult for the owners to raise capital and harvest their forests. At the same time emigration from rural to urban areas reduces the number of available workers. The workers who remain are aging and few younger workers are drawn to the hard and dangerous labor involved with forestry, despite the fact that wages for forestry work are increasing.

On the demand side, stumpage prices for the major domestic species (*sugi*, *hinoki*, and pine) have been declining precipitously since 1980. Caught between rising costs of production and declining prices, many forestry households are finding it more and more difficult to continue in business. This point is illustrated by a set of financial statistics published by the Forestry Agency in Japan. Based on a time series of production cost and stumpage price data, the Forestry Agency calculated the internal rate of return derived from an investment in a *sugi* plantation. Using their own methodology, the Forestry Agency estimates that the internal rate of return from a *sugi* plantation has declined from 6.3% in 1965 to 4.1% in 1975 to 2.1% in 1985 to 0.9% in 1993 (the most current year for which this data is available). Their results clearly show that it is becoming virtually impossible to manage a forest plantation as a viable economic enterprise.

This situation occurs partly because, according to author Nicholas Kristoff (2000), most small forest owners employ an economic principle that does not necessarily aim to maximize profits, but rather takes into account community welfare considerations. These small businesses, which at one time did not face competition from larger suppliers, are not faring well in the face of competition from large international corporations. According to Kristoff, these small rural-based Japanese businesses pay higher than market wages and hire more workers than needed. They also produce high-quality goods that they can be proud of and build roads to benefit their communities. While the rural business owner contributes to his community, they are generally not efficient producers.

Given the high cost of forestry in Japan relative to other supply regions of the world, it is time to reassess the future role of the forestry sector in Japan. Given the comparative disadvantage that Japan faces in the production of timber, it may be time to focus on the environmental role of the forests, rather than the role of the forest as a raw material supply.

Japan's Lumber Industry

There are a variety of factors that have adversely affected Japan's domestic lumber industry as well. These factors include the structure of the industry itself, including rising production costs and the small, regional structure of the sawmills, regulatory reform within the residential construction industry that has affected the demand for lumber produced from domestic species like *sugi*, and increased imports of low cost, high quality lumber.

The structure of the domestic sawmill industry and its impact on competitiveness has been discussed. In addition to structural changes, regulatory reform has also substantially changed the materials demanded. For example, in May 2001 the Government Housing Loan Corporation revised their conditions for receiving a home mortgage to require the use of treated lumber for ground sills in all new housing. This means that all new housing purchased using a GHLC mortgage must utilize treated lumber in ground sill applications that meets or exceeds the JAS K3 criteria. Previously ground sills were only required to meet the JAS K2 criteria. This regulatory change was adopted to meet the new ten-year housing warranty requirement contained within the Housing Quality Assurance Act (HQAA), which was adopted last year. The new requirement will likely exclude the use of a domestic species such as larch, which is difficult to treat with preservatives, in ground sill applications. Until now, larch ground sills had been used extensively in the central interior districts of Japan.

It is also generally accepted that the housing construction industry will start to use kiln-dried lumber to meet the ten-year warranty criteria specified by the HQAA. But while demand is expected to rise, a recent survey of the sawmill industry by the Forestry Agency found that in 1999 only 1,452 sawmills (9.3% of total) had dry kilns. The volume of kiln-dried lumber produced domestically increased to 1.98 million m^3, a 13.6% increase from 1998. The volume of kiln-dried lumber produced in 1999 represents 11.1% of total lumber production in Japan. However, the 1.98 million m^3 of kiln dried lumber produced in 1999 was just one-third of the installed production capacity for the industry.

Finally, foreign companies have increased their lumber exports to Japan. Often foreign lumber is lower priced and higher quality than domestically produced lumber, and local manufacturers find themselves at a competitive disadvantage in many of the larger urban markets. This is, in part, a reflection of the continued strength of the yen relative to foreign currencies, partly in Canada and northern Europe. While the competition is somewhat less in local, rural markets, many foreign companies are actively looking to expand into these markets. There is little doubt that competition within the Japanese lumber market will continue to increase. The increasingly competitive business environment will force more consolidation and closures within Japan's sawmill industry, particularly within the small 'mom-and-pop' segment of the industry. Thus, in order to remain viable operations, domestic lumber manufacturers must develop a strategy that will allow them to compete within the new business environment.

Trends in the Plywood Industry

Japan's plywood industry has struggled with several major changes over the past three decades. During the 1970s, competition from lower priced Korean plywood forced the Japanese plywood industry to change from an export-oriented industry to a domestic-focused industry. In the mid-1980s, a log export ban in Indonesia caused rapid price increases and disruptions in tropical hardwood log supplies that led to the closure of older, less efficient Japanese mills and forced other mills to identify new raw material supplies. The rapid growth of the Indonesian plywood industry into the leading exporter of plywood globally led to a new set of challenges for the Japanese plywood industry. The huge wave of low cost, high quality Indonesian plywood forced a new wave of mill closures in Japan and led other mills to shift their raw material supply away from tropical hardwood logs towards softwood logs. Today, many Japanese plywood mills have shifted to producing softwood plywood or a combination of softwood/hardwood plywood. To a large degree these mills utilize a combination of radiata pine veneers for the core layers and Russian pine and larch veneers for the face layers.

Imports of oriented strandboard (OSB) will pose a challenge for the plywood industry, although OSB has been slow to gain acceptance with homebuilders. There are two reasons for the resistance to using OSB. First, many builders and home buyers are concerned that OSB will not perform well in the hot humid climate in Japan and second, many OSB manufacturers have been reluctant to provide OSB in the 3'x6' size that Japanese builders prefer (as compared to the standard 4'x8' panel size utilized in North America). Currently there are no OSB mills in Japan. Given the relatively high cost structure and reliance on imported raw materials, many industry experts predict that there will be continued consolidation and mill closures within the plywood industry as well as continued investment in production facilities in Southeast Asia (primarily Indonesia and Malaysia) and Mainland China.

Trends in the Glulam Industry

Manufacturers of structural glulam lumber have derived tremendous benefits from two significant changes that have affected the demand for wood products in the residential construction industry. The first major change is the increased use of pre-cut components in the construction of post and beam homes. The second has been the passage of the Housing Quality Assurance Act and the Ten Year Housing Warranty provision contained within the HQAA. Both of these changes have increased the demand for glulam lumber due to its greater dimensional stability relative to solid wood structural lumber, particularly in the larger cross-sectional sizes. There is little doubt that the demand for these products will continue to increase as the HQAA and the Ten Year Housing Warranty are fully implemented.

Import Trends

Japanese imports of lumber have increased rapidly since 1958, reaching a record volume of just over 11 million m^3 in 1996 before declining during the economic recession. Growing demand for imported lumber can be attributed to several fundamental factors. Strong growth in the housing sector, which has traditionally favored wooden houses, has generated the basic demand for lumber in Japan. The high cost of growing, harvesting and manufacturing lumber provided the initial opportunity for foreign lumber to enter the Japanese market. The strong yen that resulted from the Bretton-Woods agreement in the mid-1970s led to a situation where imported lumber was often cheaper than domestically produced lumber. The net result of these market dynamics is that lumber imports have grown by 138% from 1973-2000, while lumber production in Japan has declined by 61% over the same period.

The import data clearly show that since the mid-1990s, European suppliers have displaced US and Canadian suppliers. Many industry observers have attributed this to a combination of factors, including a favorable Euro/yen exchange rate relative to the US and Canadian currencies, artificially low transportation rates, and a high quality product with a light color and good appearance. However, as much as low price and good quality might have helped, several industry observers in Japan have indicated that European suppliers have worked hard to penetrate the Japanese market by going around the traditional import channels and selling directly to the end-user (including glulam manufacturers, precutters, and home builders). They have also been willing to ship small volumes of specialty products to new customers in rural areas (a risky venture) in an effort to develop a relationship with key customers. To the extent that these relationship and service factors have been important contributors to the European success, we would be wise to explore the role of these factors further.

There can be little doubt that, given the immediate impact of the regulatory changes in the housing sector (HQAA and the 10-year Housing Warranty), the mix of products and species is changing rapidly. The market is shifting to using kiln-dried lumber, which has displaced hemlock to a large extent due to the difficulty of drying this species. A similar process may be happening with *sugi* as well for the same reasons. Demand for yellow cedar and treated lumber in ground sill (*dodai*) applications has also increased as a result of the 10-year Housing Warranty. In addition, the increased role of the precutting industry has helped stimulate demand for glulam timber.

The Impact of Forest Policy and Subsidy Programs on Trade

Recent Forestry Agency's package of subsidies and support programs were put into place in order to 1). Address the changing role of Japan's forests and provide more public benefit and to 2). Ameliorate the difficulties of the forestry and wood processing sectors caused by the uncompetitive circumstances of forestry and wood processing sectors. In principle, these policies have grave implications for trade in that they provide support for increasing utilization of domestic forest stock through the promotion of increased domestic wood-use. The effect of these policies should be negative for wood imports. However, although the policies have been altered in the last five years, and include more public benefit, the government's historic heavy thread of support to industry remains the same. Many of the support programs such as kiln drying equipment loans and grants, pre-cutting support programs, more rationalization programs through Rationalized Systems Certification (HOWTEC) and other programs are targeted at responding to a performance based regulatory environment introduced internally. Looking at the history of Japan's assistance programs it can be observed that these programs, even the new programs implemented in the last five years, have not caused any perceptible change in the overall wood self-sufficiency rate except in 1998 when the Forestry Agency announced that their domestic species utilization policy was working as wood self-sufficiency increased by 1% to 21%. The objectives of a domestic wood utilization centric policy have long been in place. Perhaps the largest impact of policy in having to try to meet the public's demand for diversified forest functions and to place an increasingly larger area of the National Forest as protection forest area, is that private contractors and cooperatives have benefited and that rural employment has been maintained. That these programs have contributed to an overall increase in efficiency or to a strengthening of Japan's forestry and forest products' competitiveness position is doubtful. Trade impacts, as measured in domestic wood market share increases, have yet to be felt.

The Impact of Trade Restrictions

Simulations of the impacts of a 25% increase in Japan's tariffs for wood products under a Safeguard Action, using the CINTRAFOR Global Trade Model (CGTM), clearly indicates that a Safeguard Action will substantially change trade flows. Lumber imports to Japan are eliminated, yet log imports are not. Instead, the lower priced log imports replace the majority of the lumber imports eliminated under a Safeguard Action. Hence, a Safeguard Action is likely to increase the use of imported log materials more so than Japan's own domestic resource.

This result from the CGTM simulations assumes that comparable log substitutes are available for substituting lumber imports. The model simulations also assume that valued added processing is substitutable by log imports. Both assumptions should be considered with caution because it implies that Japan can produce the kiln-dry material it is presently importing at a competitive price from imported logs and its own domestic resource.

The tariff increase provides Japan with an edge in their domestic market. It is not sustainable, however, without maintaining the tariff in place. Hence, a Safeguard Action affords only temporary relief from lumber imports. Preliminary simulations with the trade model suggest that removing the tariffs after a two-year period results in a dissipation of the gains to Japan from imposing higher tariffs. Further work in this area is needed to determine the extent to which tariff increases causes any permanent change in the competitiveness of Japan's forest sector.

CONCLUDING OBSERVATIONS

Over the past forty years Japan has increasingly come to rely on imported timber to supply the raw material demand for the forest products industry. Today, over eighty percent of the wood processed by the forest products industry is imported. However, this figure varies considerably across specific industry sectors. For example, imports of softwood lumber account for approximately thirty percent of total softwood lumber consumption. While rapidly increasing imports of softwood lumber, particularly from European countries, have caused concern within MAFF and some sectors of the sawmill industry, it is important to note that the total volume of softwood lumber imports had declined by more than ten percent over the period 1996-2000. And while it is true that imports of softwood lumber from Europe have increased substantially since 1993, this increase has been offset to a large extent by substantial declines in imports from Canada and the US.

Over the past five years, two significant factors have dramatically changed the competitive landscape of the softwood industry in Japan. The first factor was the Kobe earthquake which provided the impetus for the passage of the Housing Quality Assurance Act. The second factor was the Asian economic crisis and a series of recessions that have affected the Japanese economy over the past four years. These regulatory and economic events have combined to substantially change the structure of the demand for softwood lumber. Specifically, these events have increased the price sensitivity of Japanese buyers, seen species preferences change from North American hemlock (and to some extent Japanese *sugi*) towards European whitewoods, seen product demand change from green lumber towards kiln dried lumber and from solid sawn lumber to glue laminated lumber.

The Japanese forest products sector, already marginally competitive in many market segments, has seen its competitiveness reduced still further by the recent regulatory and economic trends in Japan. A combination of high raw material costs, high processing costs, and the small size and production capability, low productivity, and out-dated processing technology of the typical Japanese sawmill severely restricts the ability of the industry to respond to this new competitive environment. In particular, the small size and production capacity of the typical sawmill restricts the ability of these firms to access capital and new processing technology that could help them increase their competitiveness. It is these systemic internal issues that are at the core of the competitiveness issue within the Japanese sawmill issue.

The lack of competitiveness of Japan's wood producers and the continued growth in imported lumber and lumber products have led the Japanese government to review lumber import trends and their relation to the depressed wood products market. One possible result of the inquiry could be the implementation of a policy to safeguard the domestic industry from further growth in wood product imports. Any Safeguard Action under WTO guidelines would require the Japanese government to: (i) identify the affected industry (i.e., the forestry sector, the processing sector or value-added sector); (ii) identify the affected product and its relation to substitute import products; (iii) determine the unforeseen development that have led to a sharp increase in imports and resulted in injury to the affected industry; and (iv) determine how a Safeguard Action would improve the competitiveness of the affected industry over the 4 to 8 year period it is in effect.

The greatest challenge confronting the Japanese will be developing a strategy to improve the competitiveness of the sawmill industry. The first challenge relates to the fact that very little baseline production and performance data exists at the sawmill level, particularly for small and medium-sized mills. To address this deficiency, the Japan Federation of Wood Industry Associations is engaged in collecting monthly production and performance data from a sample of their membership. While this type of information will permit the government to track industry competitiveness during the course of a potential Safeguard Action, it is clear that it will be difficult if not impossible to develop a strategy to increase the competitiveness of every segment of the industry. It is most likely that the government will have to focus its attention on improving the competitiveness of the medium and large sized sawmills, ignoring the smaller sawmills that constitute the largest segment of the industry.

Why would this important segment of the sawmill industry most likely be ignored? Given the combination of high raw material, production, and distribution costs along with the low productivity levels and out-dated technology production technology that exists across the small and medium-sized segment of the sawmill industry in Japan, it is difficult to envision a strategy that would restore the competitiveness of the industry relative to lower cost international producers. In addition, it is important to note that the shift of the construction industry towards kiln dried lumber will further disadvantage the domestic sawmill industry, particularly those mills processing *sugi* logs. This is true for two reasons. First, the small diameter and relatively poor quality of second growth *sugi* makes it difficult to kiln dry and results in high levels of degrade during the drying process. Secondly, the 10-year Warranty has caused many builders to move away from using unseasoned *sugi* because of its tendency to warp and twist.

It is clear that the implementation of a Safeguard Action designed to provide the domestic sawmill industry with relief from competition from imported softwood lumber would not be likely to improve the competitiveness of the industry in the long-run. Most small and many medium-sized sawmills simply do not have a comparative advantage in the production of softwood lumber relative to lower cost producers in other countries given the internal systemic issues that exist within the industry. The net result of any Safeguard Action would be to impose high costs on Japanese consumers and homebuyers while having only a marginal impact on the competitiveness of the sawmill industry.

CHAPTER 10. BIBLIOGRAPHY

APA, 2000. Japan Market Report 2000. American Plywood Association-The Engineered Wood Association. Japan Office. Tokyo, Japan. 63 pages.

APA, 2001. Interim Report of Japanese Wood Production. American Plywood Association-The Engineered Wood Association. Japan Office. Tokyo, Japan. 14 pages.

Building Center of Japan, 1998. A Quick Look at Housing in Japan. 4th Edition 1998. Building Center of Japan. Tokyo, Japan. 50 pages.

Cardellichio, Peter, et al. 1989. A Preliminary Analysis of Timber and Timber Products Production, Consumption, Trade, and Prices in the Pacific Rim Until 2000. Working Paper 22. Center for International Trade in Forest Products. Seattle,1989.

Forestry Agency, 1992. Forestry White Paper, Fiscal Year 1991. Summary. MAFF. Tokyo, Japan. 40 pages.

Forestry Agency, 1993. Forest Industry Statistics, Time Series, 1992. Ministry of Agriculture, Forestry, and Fisheries. Tokyo, Japan. 133 pages. *(in Japanese)*

Forestry Agency, 1998. Forestry White Paper, Fiscal Year 1997. Summary. Provisional Translation. MAFF. Tokyo, Japan.

Forestry Agency, 1998. Forest Industry Statistics, 1997. Ministry of Agriculture, Forestry, and Fisheries. Tokyo, Japan. *(in Japanese)*

Forestry Agency, 1999. Forestry White Paper, Fiscal Year 1998. Summary. Provisional Translation. MAFF. Tokyo, Japan.

Forestry Agency, 1999. Forest Industry Statistics, 1998. Ministry of Agriculture, Forestry, and Fisheries. Tokyo, Japan. *(in Japanese)*

Forestry Agency, 2000. Forestry White Paper, Fiscal Year 1999. Summary. Provisional Translation. MAFF. Tokyo, Japan.

Forestry Agency, 2000. Forest Industry Statistics, 1999. Ministry of Agriculture, Forestry, and Fisheries. Tokyo, Japan. *(in Japanese)*

GHLC, 1999. Housing Statistics of Japan. Government Housing Loan Corporation. Tokyo, Japan. 178 pages.

Housing Industry Information Service, Inc., 1999. Housing Industry Handbook, 1998. Tokyo, Japan. 236 pages. *(in Japanese)*

Housing Industry Information Service, Inc., 2000. Housing Industry Handbook, 1999. Tokyo, Japan. 176 pages. *(in Japanese)*

Handa, R. (editor), 1988. Forest Policy in Japan. Nippon Ringyo Chosakai. Tokyo, Japan. 457 pages.

Iwai, Y. (editor), 2001. Forestry and Forest Industry in Japan. University of British Columbia Press. (in publication)

Japan Lumber Journal, 1995. The Forest Products Yearbook of Japan 1994-1995. 71 pages.

Japan Lumber Reports, various issues. Tokyo, Japan

Japan Wood-Products Information and Research Center (JAWIC), 1997. Forest and Forestry in Japan – Toward Sustainable Forest Management. Tokyo, Japan. 28 pages.

Japan Wood-Products Information and Research Center (JAWIC), Various issues. Wood Supply and Demand Information Service. Tokyo, Japan.

Kristoff,N. and C. Duwunn. Thunder From the East. Alfred A. Knopf Publishers, New York. 377 pages.

MAFF, 1997. Wood Supply and Demand Report 1996. Ministry of Agriculture, Forestry, and Fisheries. Tokyo, Japan.

MAFF, 2000. Wood Supply and Demand Report 1999. Ministry of Agriculture, Forestry, and Fisheries. Tokyo, Japan.

MAFF, 2000. The 74th Statistical Yearbook of Ministry of Agriculture, Forestry, and Fisheries: 1997-1998. Statistics and Information Department, MAFF. Tokyo, Japan. 621 pages.

MAFF, 2000. Report on Agricultural, Forestry, and Fishery Trade 2001. Summary. Ministry of Agriculture, Forestry, and Fisheries. Tokyo, Japan. 43 pages.

MAFF, 2001. The 75th Statistical Yearbook of Ministry of Agriculture, Forestry, and Fisheries: 1998-1999. Statistics and Information Department, MAFF. Tokyo, Japan. 613 pages.

Management and Coordination Agency, 2001. Japan Statistical Yearbook 2001. Statistics Bureau. Tokyo, Japan. 913 pages.

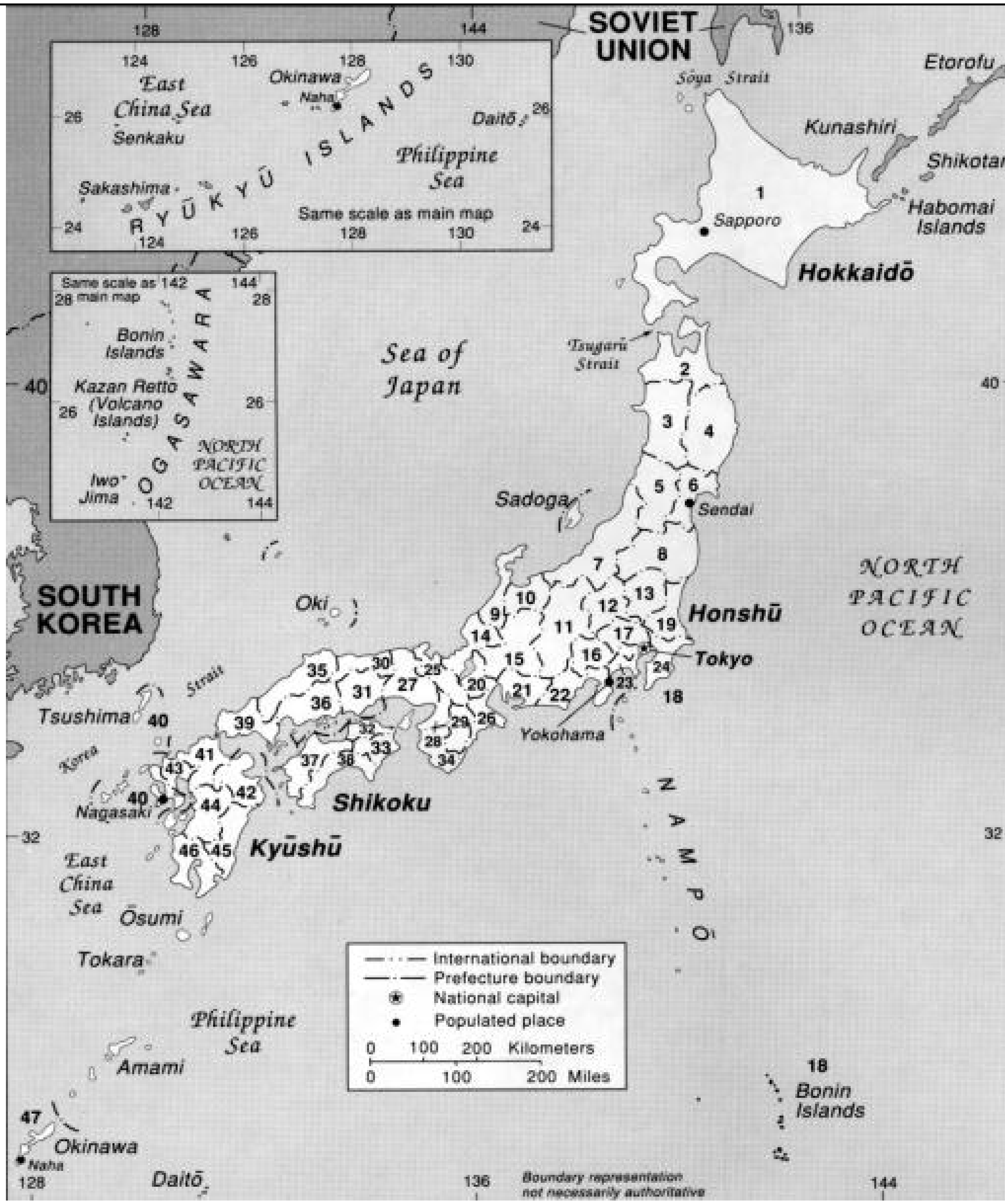
OECD, 2001. International Energy Agency. Paris.

SEC, 2001. Softwood Product Markets in Japan. Softwood Export Council, Japan Office. 20 pages.

Villaneuva, R. 1988. The International Housing Situation: Housing Economics. The National Association of Home Builders. Washington, DC.

Appendices

APPENDIX A. MAPS OF JAPANESE PREFECTURES AND REGIONS



Japan Prefectures
Hokkaido
Aomori
Akita
Iwate
Yamagata
Miyagi
Niigata
Fukushima
Ishikawa
Toyama
Nagano
Gumma
Tochigi
Fukui
Gifu
Yamanashi
Saitama
Tokyo
Ibaraki
Shiga
Aichi
Shizuoka
Kanagawa
Chiba
Kyoto
Mie
Hyogo
Osaka
Nara
Tottori
Okayama
Kagawa
Tokushima
Wakayama
Shimane
Hiroshima
Ehime
Kochi
Yamaguchi
Nagasaki
Fukuoka
Oita
Saga
Kumamoto
Miyazaki
Kagoshima
Okinawa

Regions of Japan


Chugoku Region
Tottori
Shimane
Okayama
Hiroshima
Yamaguchi


Kinki Region
Kyoto
Shiga
Hyogo
Osaka
Mie
Nara
Wakayama


Kyushu-Okinawa Region
Saga
Fukuoka
Nagasaki
Oita
Kumamoto
Miyazaki
Kagoshima
Okinawa


Kagawa
Ehime
Tokushima
Kochi
Shikoku Region

APPENDIX B. SAWMILL INDUSTRY STATISTICS

Table B-1. Sawmills, Employees, and Lumber Production in Japan by Prefecture.

	1996			1999		
Prefecture	**Sawmills**	**Employees**	**Production** (1,000 m^3)	**Sawmills**	**Employees**	**Production** (1,000 m^3)
Total	13,990	99,464	24,206,000	12,247	78,757	18,165,000
Hokkaido	482	7,149	2,115,000	388	5,346	1,615,000
Aomori	292	2,219	474,000	258	1,782	343,000
Iwate	331	2,618	575,000	313	2,243	478,000
Miyagi	279	2,012	388,000	251	1,453	290,000
Akita	321	3,020	661,000	261	2,279	467,000
Yamagata	310	2,071	462,000	273	1,598	358,000
Fukushima	481	3,527	1,218,000	420	2,738	821,000
Ibaragi	335	1,941	386,000	287	1,544	277,000
Tochigi	363	2,118	491,000	315	1,759	373,000
Gunma	301	1,675	258,000	244	1,243	188,000
Saitama	166	872	154,000	159	788	110,000
Chiba	333	1,375	140,000	313	1,207	107,000
Tokyo	85	506	89,000	68	290	55,000
Kanagawa	111	442	34,000	78	294	20,000
Niigata	618	3,719	642,000	563	2,912	430,000
Toyama	207	2,028	839,000	182	1,763	688,000
Ishikawa	230	1,284	288,000	210	1,069	235,000
Fukui	321	1,643	234,000	295	1,395	181,000
Yamanashi	136	668	138,000	114	459	85,000
Nagano	478	2,690	516,000	401	2,052	349,000
Gigu	657	3,290	497,000	579	2,539	366,000
Shizuoka	640	4,214	946,000	546	3,390	677,000
Aichi	497	3,243	673,000	404	2,408	455,000
Mie	646	3,529	725,000	593	2,892	534,000
Shiga	276	1,658	193,000	257	1,420	139,000
Kyoto	214	1,411	318,000	172	1,074	220,000
Osaka	93	695	91,000	93	624	61,000
Hyogo	318	2,456	464,000	280	1,987	314,000
Nara	417	2,217	458,000	380	1,779	309,000
Wakayama	270	2,201	826,000	231	1,632	525,000
Tottori	136	1,030	142,000	117	822	113,000
Shimane	217	1,658	241,000	198	1,277	174,000
Okayama	224	1,865	480,000	197	1,567	378,000
Hiroshima	270	2,727	1,609,000	229	2,279	1,428,000
Yamaguchi	197	1,551	422,000	169	1,132	309,000
Tokushima	235	1,732	758,000	195	1,343	502,000
Kagawa	87	802	155,000	75	632	114,000
Ehime	285	2,622	1,031,000	257	2,157	802,000
Kouch	220	1,983	537,000	186	1,538	411,000
Fukuoka	325	2,674	736,000	291	2,183	569,000
Saga	134	870	123,000	123	702	86,000
Nagasaki	149	806	95,000	135	661	74,000
Kumamoto	277	2,397	564,000	268	2,070	492,000
Oita	342	2,489	722,000	289	1,895	577,000
Miyazaki	333	3,338	856,000	279	2,684	719,000
Kagoshima	339	2,304	430,000	300	1,765	340,000
Okinawa	12	125	12,000	11	91	7,000

Table B-2. Sawmill Productivity in Japan, 1996 vs. 1999.

	1996			1999		
Prefecture	Employees /Mill	Production per Mill (1,000 m^3)	Production per Employee (1,000 m^3)	Employees/ Mill	Production per Mill (1,000 m^3)	Production per Employee (1,000 m^3)
Total	7.11	1730.24	243.36	6.43	1483.22	230.65
Hokkaido	14.83	4387.97	295.85	13.78	4162.37	302.10
Aomori	7.60	1623.29	213.61	6.91	1329.46	192.48
Iwate	7.91	1737.16	219.63	7.17	1527.16	213.11
Miyagi	7.21	1390.68	192.84	5.79	1155.38	199.59
Akita	9.41	2059.19	218.87	8.73	1789.27	204.91
Yamagata	6.68	1490.32	223.08	5.85	1311.36	224.03
Fukushima	7.33	2532.22	345.34	6.52	1954.76	299.85
Ibaragi	5.79	1152.24	198.87	5.38	965.16	179.40
Tochigi	5.83	1352.62	231.82	5.58	1184.13	212.05
Gunma	5.56	857.14	154.03	5.09	770.49	151.25
Saitama	5.25	927.71	176.61	4.96	691.82	139.59
Chiba	4.13	420.42	101.82	3.86	341.85	88.65
Tokyo	5.95	1047.06	175.89	4.26	808.82	189.66
Kanagawa	3.98	306.31	76.92	3.77	256.41	68.03
Niigata	6.02	1038.83	172.63	5.17	763.77	147.66
Toyama	9.80	4053.14	413.71	9.69	3780.22	390.24
Ishikawa	5.58	1252.17	224.30	5.09	1119.05	219.83
Fukui	5.12	728.97	142.42	4.73	613.56	129.75
Yamanashi	4.91	1014.71	206.59	4.03	745.61	185.19
Nagano	5.63	1079.50	191.82	5.12	870.32	170.08
Gigu	5.01	756.47	151.06	4.39	632.12	144.15
Shizuoka	6.58	1478.13	224.49	6.21	1239.93	199.71
Aichi	6.53	1354.12	207.52	5.96	1126.24	188.95
Mie	5.46	1122.29	205.44	4.88	900.51	184.65
Shiga	6.01	699.28	116.41	5.53	540.86	97.89
Kyoto	6.59	1485.98	225.37	6.24	1279.07	204.84
Osaka	7.47	978.49	130.94	6.71	655.91	97.76
Hyogo	7.72	1459.12	188.93	7.10	1121.43	158.03
Nara	5.32	1098.32	206.59	4.68	813.16	173.69
Wakayama	8.15	3059.26	375.28	7.06	2272.73	321.69
Tottori	7.57	1044.12	137.86	7.03	965.81	137.47
Shimane	7.64	1110.60	145.36	6.45	878.79	136.26
Okayama	8.33	2142.86	257.37	7.95	1918.78	241.23
Hiroshima	10.10	5959.26	590.03	9.95	6235.81	626.59
Yamaguchi	7.87	2142.13	272.08	6.70	1828.40	272.97
Tokushima	7.37	3225.53	437.64	6.89	2574.36	373.79
Kagawa	9.22	1781.61	193.27	8.43	1520.00	180.38
Ehime	9.20	3617.54	393.21	8.39	3120.62	371.81
Kouch	9.01	2440.91	270.80	8.27	2209.68	267.23
Fukuoka	8.23	2264.62	275.24	7.50	1955.33	260.65
Saga	6.49	917.91	141.38	5.71	699.19	122.51
Nagasaki	5.41	637.58	117.87	4.90	548.15	111.95
Kumamoto	8.65	2036.10	235.29	7.72	1835.82	237.68
Oita	7.28	2111.11	290.08	6.56	1996.54	304.49
Miyazaki	10.02	2570.57	256.44	9.62	2577.06	267.88
Kagoshima	6.80	1268.44	186.63	5.88	1133.33	192.63
Okinawa	10.42	1000.00	96.00	8.27	636.36	76.92

Table B-3. Breakdown of Prefectural Sawmills by Source of Timber and Production, 1996.

Prefecture	Domestic Sawmills	Imported Sawmills	Dom. Lumber Production	Imp. Lumber Production	Production/ Mill (Dom)	Production/ Mill (Imp)
Total	11,856	8,075	10,926,000	13,280,000	921.56	1,644.58
Hokkaido	440	294	1,403,000	712,000	3,188.64	2,421.77
Aomori	265	155	256,000	218,000	966.04	1,406.45
Iwate	324	179	427,000	148,000	1,317.90	826.82
Miyagi	251	197	240,000	148,000	956.18	751.27
Akita	309	88	560,000	101,000	1,812.30	1,147.73
Yamagata	284	223	172,000	290,000	605.63	1,300.45
Fukushima	413	321	357,000	861,000	864.41	2,682.24
Ibaragi	286	167	190,000	196,000	664.34	1,173.65
Tochigi	313	138	359,000	132,000	1,146.96	956.52
Gunma	252	209	127,000	131,000	503.97	626.79
Saitama	145	96	82,000	72,000	565.52	750.00
Chiba	314	105	64,000	76,000	203.82	723.81
Tokyo	61	46	21,000	68,000	344.26	1,478.26
Kanagawa	85	75	14,000	20,000	164.71	266.67
Niigata	522	512	130,000	512,000	249.04	1,000.00
Toyama	135	188	16,000	823,000	118.52	4,377.66
Ishikawa	182	205	70,000	218,000	384.62	1,063.41
Fukui	296	242	83,000	151,000	280.41	623.97
Yamanashi	102	123	18,000	120,000	176.47	975.61
Nagano	365	379	177,000	339,000	484.93	894.46
Gigu	595	437	273,000	224,000	458.82	512.59
Shizuoka	448	435	320,000	626,000	714.29	1,439.08
Aichi	329	377	125,000	548,000	379.94	1,453.58
Mie	586	256	497,000	228,000	848.12	890.63
Shiga	254	238	46,000	147,000	181.10	617.65
Kyoto	146	165	45,000	273,000	308.22	1,654.55
Osaka	64	87	15,000	76,000	234.38	873.56
Hyogo	217	255	126,000	338,000	580.65	1,325.49
Nara	375	145	259,000	199,000	690.67	1,372.41
Wakayama	169	175	167,000	659,000	988.17	3,765.71
Tottori	124	87	62,000	80,000	500.00	919.54
Shimane	208	135	130,000	111,000	625.00	822.22
Okayama	203	76	364,000	116,000	1,793.10	1,526.32
Hiroshima	210	151	121,000	1,488,000	576.19	9,854.30
Yamaguchi	173	142	86,000	336,000	497.11	2,366.20
Tokushima	176	101	203,000	555,000	1,153.41	5,495.05
Kagawa	35	77	8,000	147,000	228.57	1,909.09
Ehime	234	132	459,000	572,000	1,961.54	4,333.33
Kouch	204	61	272,000	265,000	1,333.33	4,344.26
Fukuoka	263	154	283,000	453,000	1,076.05	2,941.56
Saga	114	91	53,000	70,000	464.91	769.23
Nagasaki	146	96	47,000	48,000	321.92	500.00
Kumamoto	267	47	508,000	56,000	1,902.62	1,191.49
Oita	317	101	553,000	169,000	1,744.48	1,673.27
Miyazaki	322	52	787,000	69,000	2,444.10	1,326.92
Kagoshima	328	52	349,000	81,000	1,064.02	1,557.69
Okinawa	5	8	2,000	10,000	400.00	1,250.00

Table B-4. **Breakdown of Prefectural Sawmills by Source of Timber and Production, 1999.**

Prefecture	Domestic Sawmills	Imported Sawmills	Dom. Lumber Production	Imp. Lumber Production	Production/ Mill (Dom)	Production/ Mill (Imp)
Total	10,504	6,664	8,751,000	9,414,000	833.11	1,412.67
Hokkaido	357	234	1,092,000	523,000	3,058.82	2,235.04
Aomori	233	128	183,000	160,000	785.41	1,250.00
Iwate	302	160	375,000	103,000	1,241.72	643.75
Miyagi	236	161	195,000	95,000	826.27	590.06
Akita	255	64	392,000	75,000	1,537.25	1,171.88
Yamagata	246	193	143,000	215,000	581.30	1,113.99
Fukushima	364	272	284,000	537,000	780.22	1,974.26
Ibaragi	243	138	142,000	135,000	584.36	978.26
Tochigi	276	107	298,000	75,000	1,079.71	700.93
Gunma	201	145	102,000	86,000	507.46	593.10
Saitama	142	87	67,000	43,000	471.83	494.25
Chiba	297	85	52,000	55,000	175.08	647.06
Tokyo	39	28	12,000	43,000	307.69	1,535.71
Kanagawa	69	47	8,000	12,000	115.94	255.32
Niigata	484	452	92,000	338,000	190.08	747.79
Toyama	118	167	14,000	674,000	118.64	4,035.93
Ishikawa	170	182	55,000	180,000	323.53	989.01
Fukui	277	210	76,000	105,000	274.37	500.00
Yamanashi	86	95	18,000	67,000	209.30	705.26
Nagano	315	303	129,000	220,000	409.52	726.07
Gigu	532	347	220,000	146,000	413.53	420.75
Shizuoka	386	379	251,000	426,000	650.26	1,124.01
Aichi	281	292	86,000	369,000	306.05	1,263.70
Mie	549	210	400,000	134,000	728.60	638.10
Shiga	233	217	46,000	93,000	197.42	428.57
Kyoto	121	129	28,000	192,000	231.40	1,488.37
Osaka	60	75	10,000	51,000	166.67	680.00
Hyogo	194	211	92,000	222,000	474.23	1,052.13
Nara	347	130	184,000	125,000	530.26	961.54
Wakayama	156	132	145,000	380,000	929.49	2,878.79
Tottori	109	74	52,000	61,000	477.06	824.32
Shimane	190	124	102,000	72,000	536.84	580.65
Okayama	182	51	297,000	81,000	1,631.87	1,588.24
Hiroshima	185	119	95,000	1,333,000	513.51	11,201.68
Yamaguchi	143	115	71,000	238,000	496.50	2,069.57
Tokushima	145	78	185,000	317,000	1,275.86	4,064.10
Kagawa	27	66	6,000	108,000	222.22	1,636.36
Ehime	212	114	345,000	457,000	1,627.36	4,008.77
Kouch	173	47	211,000	200,000	1,219.65	4,255.32
Fukuoka	244	123	240,000	329,000	983.61	2,674.80
Saga	108	82	37,000	49,000	342.59	597.56
Nagasaki	126	88	45,000	29,000	357.14	329.55
Kumamoto	261	42	455,000	37,000	1,743.30	880.95
Oita	269	77	453,000	124,000	1,684.01	1,610.39
Miyazaki	266	34	669,000	50,000	2,515.04	1,470.59
Kagoshima	290	43	295,000	45,000	1,017.24	1,046.51
Okinawa	5	7	2,000	5,000	400.00	714.29

Table B-5. Japanese Sawmills, by Prefecture and Number of Employees,1996.

Prefecture	Sawmills	<4	5-9	10-19	20-29	30-49	50+
Total	13,990	6,705	4,421	2,042	533	224	65
Hokkaido	482	57	109	223	61	25	7
Aomori	292	108	117	50	13	3	1
Iwate	331	140	85	72	28	6	0
Miyagi	279	130	103	30	10	5	1
Akita	321	107	104	78	22	9	1
Yamagata	310	168	90	34	11	6	1
Fukushima	481	217	173	59	18	11	3
Ibaragi	335	173	115	38	8	0	1
Tochigi	363	184	126	46	3	3	1
Gunma	301	164	96	31	9	1	0
Saitama	166	107	46	9	2	1	1
Chiba	333	246	67	14	6	0	0
Tokyo	85	45	28	9	1	2	0
Kanagawa	111	73	32	6	0	0	0
Niigata	618	336	187	71	18	5	1
Toyama	207	84	67	35	9	5	7
Ishikawa	230	142	56	26	4	1	1
Fukui	321	184	99	33	5	0	0
Yamanashi	136	85	37	12	1	0	1
Nagano	478	252	160	53	11	2	0
Gigu	657	417	172	53	13	1	1
Shizuoka	640	303	212	95	20	10	0
Aichi	497	222	190	69	10	4	2
Mie	646	371	194	65	12	3	1
Shiga	276	152	93	21	5	5	0
Kyoto	214	92	84	29	6	3	0
Osaka	93	46	25	16	3	2	1
Hyogo	318	136	110	46	17	7	2
Nara	417	244	130	30	8	4	1
Wakayama	270	115	85	50	11	7	2
Tottori	136	62	44	20	4	5	1
Shimane	217	85	78	42	8	3	1
Okayama	224	99	68	32	17	7	1
Hiroshima	270	134	74	37	7	13	5
Yamaguchi	197	90	56	32	15	3	1
Tokushima	235	101	84	35	7	7	1
Kagawa	87	27	31	23	3	2	1
Ehime	285	92	102	72	10	4	5
Kouch	220	77	64	59	14	5	1
Fukuoka	325	144	114	37	16	11	3
Saga	134	69	41	16	7	1	0
Nagasaki	149	84	49	11	4	1	0
Kumamoto	277	99	91	61	22	3	1
Oita	342	155	116	51	11	7	2
Miyazaki	333	126	98	66	24	15	4
Kagoshima	339	160	113	42	17	6	1
Okinawa	12	1	6	3	2	0	0

Table B-6. Japanese Sawmills, by Prefecture and Number of Employees, 1999.

Prefecture	Sawmills	<4	5-9	10-19	20-29	30-49	50+
Total	12,247	6,533	3,602	1,543	368	151	50
Hokkaido	388	54	108	154	49	17	6
Aomori	258	123	80	41	9	5	0
Iwate	313	145	91	58	16	3	0
Miyagi	251	148	72	23	5	2	1
Akita	261	99	90	49	13	8	2
Yamagata	273	161	73	29	8	1	1
Fukushima	420	211	142	48	9	8	2
Ibaragi	287	166	79	35	5	1	1
Tochigi	315	178	97	31	6	3	0
Gunma	244	156	60	22	5	1	0
Saitama	159	107	41	7	2	1	1
Chiba	313	235	63	12	3	0	0
Tokyo	68	42	20	5	1	0	0
Kanagawa	78	57	17	4	0	0	0
Niigata	563	347	150	49	14	2	1
Toyama	182	76	58	27	10	5	6
Ishikawa	210	138	49	17	4	1	1
Fukui	295	184	84	24	3	0	0
Yamanashi	114	85	21	7	0	1	0
Nagano	401	238	117	40	6	0	0
Gigu	579	394	137	41	6	1	0
Shizuoka	546	275	174	79	12	5	1
Aichi	404	194	153	48	6	2	1
Mie	593	374	167	46	4	1	1
Shiga	257	148	84	16	4	5	0
Kyoto	172	76	67	25	2	2	0
Osaka	93	46	29	15	0	3	0
Hyogo	280	136	92	31	13	7	1
Nara	380	248	98	26	6	2	0
Wakayama	231	103	78	36	9	5	0
Tottori	117	55	40	14	6	1	1
Shimane	198	96	64	30	4	4	0
Okayama	197	96	50	32	15	2	2
Hiroshima	229	132	57	17	6	12	5
Yamaguchi	169	85	49	26	6	2	1
Tokushima	195	95	63	28	3	5	1
Kagawa	75	24	29	17	2	3	0
Ehime	257	92	101	49	7	5	3
Kouch	186	74	51	48	9	3	1
Fukuoka	291	142	92	37	12	4	4
Saga	123	74	27	15	7	0	0
Nagasaki	135	89	34	9	1	2	0
Kumamoto	268	112	83	57	13	2	1
Oita	289	132	111	32	11	3	0
Miyazaki	279	121	67	56	21	9	5
Kagoshima	300	168	88	27	15	2	0
Okinawa	11	2	5	4	0	0	0

Table B-7. Japanese Sawmills by Prefecture and Log Inputs.

Prefecture	1996			1999		
	Domestic Log Ratio	Imported Log Ratio	US Share of Imports	Domestic Log Ratio	Imported Log Ratio	US Share of Imports
Total	0.45	0.55	0.66	0.48	0.52	0.60
Hokkaido	0.68	0.32	0.49	0.70	0.30	0.30
Aomori	0.53	0.47	0.89	0.55	0.45	0.77
Iwate	0.74	0.26	0.78	0.79	0.21	0.73
Miyagi	0.61	0.39	0.82	0.65	0.35	0.79
Akita	0.86	0.14	0.56	0.83	0.17	0.39
Yamagata	0.36	0.64	0.38	0.37	0.63	0.34
Fukushima	0.32	0.68	0.61	0.37	0.63	0.40
Ibaragi	0.52	0.48	0.74	0.53	0.47	0.60
Tochigi	0.74	0.26	0.87	0.81	0.19	0.84
Gunma	0.50	0.50	0.79	0.54	0.46	0.75
Saitama	0.54	0.46	0.88	0.65	0.35	0.83
Chiba	0.48	0.52	0.84	0.49	0.51	0.85
Tokyo	0.22	0.78	0.54	0.21	0.79	0.59
Kanagawa	0.47	0.53	0.96	0.42	0.58	0.87
Niigata	0.20	0.80	0.58	0.21	0.79	0.45
Toyama	0.02	0.98	0.10	0.02	0.98	0.09
Ishikawa	0.24	0.76	0.43	0.24	0.76	0.41
Fukui	0.36	0.64	0.66	0.40	0.60	0.60
Yamanashi	0.15	0.85	0.68	0.23	0.77	0.74
Nagano	0.34	0.66	0.76	0.38	0.62	0.77
Gigu	0.56	0.44	0.67	0.62	0.38	0.65
Shizuoka	0.32	0.68	0.72	0.36	0.64	0.64
Aichi	0.18	0.82	0.53	0.18	0.82	0.48
Mie	0.68	0.32	0.75	0.75	0.25	0.70
Shiga	0.26	0.74	0.56	0.33	0.67	0.52
Kyoto	0.14	0.86	0.56	0.13	0.87	0.46
Osaka	0.16	0.84	0.57	0.20	0.80	0.60
Hyogo	0.26	0.74	0.65	0.29	0.71	0.59
Nara	0.57	0.43	0.93	0.61	0.39	0.96
Wakayama	0.20	0.80	0.93	0.28	0.72	0.90
Tottori	0.44	0.56	0.56	0.42	0.58	0.39
Shimane	0.54	0.46	0.60	0.59	0.41	0.69
Okayama	0.76	0.24	0.89	0.79	0.21	0.93
Hiroshima	0.07	0.93	0.85	0.06	0.94	0.84
Yamaguchi	0.20	0.80	0.82	0.23	0.77	0.86
Tokushima	0.28	0.72	0.89	0.36	0.64	0.90
Kagawa	0.06	0.94	0.83	0.06	0.94	0.76
Ehime	0.45	0.55	0.82	0.43	0.57	0.80
Kouch	0.49	0.51	0.12	0.53	0.47	0.10
Fukuoka	0.37	0.63	0.71	0.40	0.60	0.68
Saga	0.43	0.57	0.78	0.45	0.55	0.69
Nagasaki	0.49	0.51	0.90	0.61	0.39	0.83
Kumamoto	0.89	0.11	0.60	0.92	0.08	0.17
Oita	0.75	0.25	0.78	0.77	0.23	0.59
Miyazaki	0.91	0.09	0.56	0.92	0.08	0.58
Kagoshima	0.79	0.21	0.77	0.86	0.14	0.60
Okinawa	0.21	0.79	0.07	0.29	0.71	0.00

APPENDIX C. PLYWOOD INDUSTRY STATISTICS

Table C-1. Number of Plywood Mills, Employees and Production in Japan, 1996.

Prefecture	1996		
	Mills	Employees	Employees per mill
Total	439	23,094	53
Hokkaido	52	3,381	65
Aomori	2	103	52
Iwate	7	687	98
Miyagi	6	1,022	170
Akita	25	1,068	43
Yamagata	2	49	25
Fukushima	0	0	0
Ibaragi	4	318	80
Tochigi	1	32	32
Gunma	3	665	222
Saitama	4	298	75
Chiba	5	268	54
Tokyo	17	818	48
Kanagawa	0	0	0
Niigata	8	606	76
Toyama	3	477	159
Ishikawa	4	315	79
Fukui	1	45	45
Yamanashi	0	0	0
Nagano	3	137	46
Gigu	31	449	14
Shizuoka	17	1,419	83
Aichi	51	2,280	45
Mie	3	104	35
Shiga	2	37	19
Kyoto	3	354	118
Osaka	31	1,430	46
Hyogo	1	47	47
Nara	0	0	0
Wakayama	0	0	0
Tottori	4	168	42
Shimane	11	1,056	96
Okayama	3	189	63
Hiroshima	28	773	28
Yamaguchi	4	849	212
Tokushima	5	356	71
Kagawa	5	1,453	291
Ehime	5	159	32
Kouch	1	23	23
Fukuoka	75	909	12
Saga	4	304	76
Nagasaki	0	0	0
Kumamoto	2	301	151
Oita	0	0	0
Miyazaki	1	2	2
Kagoshima	4	133	33
Okinawa	1	10	10

Table C-2. Number of Plywood Mills, Employees and Production in Japan, 1999.

Prefecture	1999		
	Mills	Employees	Employees per mill
Total	378	17,991	48
Hokkaido	41	2,562	62
Aomori	2	103	52
Iwate	8	572	72
Miyagi	5	845	169
Akita	26	1,070	41
Yamagata	2	49	25
Fukushima	0	0	0
Ibaragi	4	328	82
Tochigi	1	32	32
Gunma	3	653	218
Saitama	4	219	55
Chiba	3	174	58
Tokyo	12	607	51
Kanagawa	0	0	0
Niigata	8	586	73
Toyama	3	403	134
Ishikawa	4	281	70
Fukui	1	45	45
Yamanashi	0	0	0
Nagano	3	59	20
Gigu	26	321	12
Shizuoka	16	1,073	67
Aichi	39	1,437	37
Mie	2	71	36
Shiga	1	19	19
Kyoto	3	309	103
Osaka	26	1,066	41
Hyogo	1	47	47
Nara	0	0	0
Wakayama	0	0	0
Tottori	4	156	39
Shimane	9	708	79
Okayama	3	156	52
Hiroshima	26	612	24
Yamaguchi	4	738	185
Tokushima	3	233	78
Kagawa	6	1,171	195
Ehime	4	30	8
Kouch	1	23	23
Fukuoka	63	767	12
Saga	3	187	62
Nagasaki	0	0	0
Kumamoto	2	301	151
Oita	0	0	0
Miyazaki	1	2	2
Kagoshima	4	121	30
Okinawa	1	10	10

Table C-3. Number of Plywood Mills in Japan, by Prefecture and Log Source (1,000 m^3), in 1996.

Prefecture	Total Log Volume	Domestic Log Volume	Imported Log Volume	SouthSeas Log Volume
Total	7,311	228	7,083	5,428
Hokkaido	507	178	329	267
Aomori	12	11	1	0
Iwate	791	23	768	400
Miyagi	1,034	4	1,030	543
Akita	879	1	878	570
Yamagata	2	2	0	0
Fukushima	0	0	0	0
Ibaragi	4	0	4	0
Tochigi	0	0	0	0
Gunma	0	0	0	0
Saitama	115	0	115	115
Chiba	68	0	68	64
Tokyo	297	0	297	297
Kanagawa	0	0	0	0
Niigata	196	1	195	194
Toyama	57	0	57	57
Ishikawa	197	0	197	41
Fukui	0	0	0	0
Yamanashi	0	0	0	0
Nagano	0	0	0	0
Gigu	2	1	1	1
Shizuoka	374	3	371	359
Aichi	452	2	450	446
Mie	8	0	8	8
Shiga	0	0	0	0
Kyoto	190	0	190	41
Osaka	231	1	230	203
Hyogo	0	0	0	0
Nara	0	0	0	0
Wakayama	0	0	0	0
Tottori	48	0	48	48
Shimane	455	1	454	454
Okayama	0	0	0	0
Hiroshima	84	0	84	82
Yamaguchi	74	0	74	69
Tokushima	234	0	234	184
Kagawa	615	0	615	615
Ehime	44	0	44	35
Kouch	1	0	1	1
Fukuoka	73	0	73	67
Saga	30	0	30	30
Nagasaki	0	0	0	0
Kumamoto	190	0	190	190
Oita	0	0	0	0
Miyazaki	0	0	0	0
Kagoshima	47	0	47	47
Okinawa	0	0	0	0

APPENDIX D. GLULAM INDUSTRY STATISTICS

Table D-1. Number of Glulam Manufacturers in Japan, by Prefecture, in 2000.

Prefecture	Mills
Total	281
Hokkaido	28
Aomori	3
Iwate	20
Miyagi	3
Akita	9
Yamagata	1
Fukushima	7
Ibaragi	1
Tochigi	5
Gunma	6
Saitama	5
Chiba	7
Tokyo	4
Kanagawa	1
Niigata	1
Toyama	6
Ishikawa	3
Fukui	3
Yamanashi	5
Nagano	3
Gigu	6
Shizuoka	16
Aichi	12
Mie	7
Shiga	0
Kyoto	2
Osaka	7
Hyogo	27
Nara	8
Wakayama	2
Tottori	3
Shimane	3
Okayama	4
Hiroshima	6
Yamaguchi	1
Tokushima	8
Kagawa	2
Ehime	7
Kouch	6
Fukuoka	7
Saga	0
Nagasaki	0
Kumamoto	4
Oita	5
Miyazaki	15
Kagoshima	2
Okinawa	0

APPENDIX E. TARIFF CODE DEFINITIONS

Table E-1. Customs Tariff Schedules of Japan, 1999.

HS Code	Product Description
4407	Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or finger-jointed, of a thickness exceeding 6mm:
4407.10	Coniferous:
	1. Of *Pinus spp., Abies spp*[1] or *Picea spp.* (excl Sitka Spruce) less than 160mm in thickness
4407.10-110	(1) Planed
	(2) Other
4407.10-121	A) Of *Pinus spp.*
4407.10-129	B) Other
	2. Of genus *Larix*, not more than 160mm in thickness
4407.10-210	(1) Planed or sanded
4407.10-290	(2) Other
	3. Other
4407.10-310	Of Incense cedar
	Other
	Planed or sanded
4407.10-321	Of *Pinus spp.*, genus *Abies* or genus *Picea*, more than 160mm in thickness
4407.10-322	Of Hemlock or other genus *Tsuga*
4407.10-323	Of Douglas-fir or other genus *Pseudotsuga*
4407.10-329	Other
	Other (rough cut)
4407.10-330	Of *Pinus spp.*
	Of Sitka spruce
4407.10-341	Not more than 160mm in thickness
4407.10-349	More than 160mm in thickness
4407.10-350	Of genus *Abies* and genus *Picea*
	Of white cedar, yellow cedar or other genus *Chamaecyparis*
4407.10-361	Not more than 160mm in thickness
4407.10-369	More than 160mm in thickness
	Of Hemlock or other genus Tsuga
4407.10-371	Not more than 160mm in thickness
4407.10-379	More than 160mm in thickness
	Of Douglas-fir or other genus *Pseudotsuga*
4407.10-381	Not more than 160mm in thickness
4407.10-389	More than 160mm in thickness
	Other
4407.10-391	Not more than 160mm in thickness
4407.10-399	More than 160mm in thickness

1. (other than Cal. red fir, grand fir, noble fir, and pacific silver fir)

Source: *Japan Tariff Association, 2000.*

APPENDIX F. JAPAN SOFTWOOD LUMBER IMPORT DATA

Table F-1. Japanese Imports of SW Lumber (Japan Tariff Association).

Product Description	HS Code	1996	1997	1998	1999	2000
SW Lumber PLANED						
SPF, planed	4407.10-110					
Canada		1,565,419	1,626,399	1,138,247	1,468,971	1,503,054
US		35,030	35,234	22,655	33,304	23,608
New Zealand		25,672	51,078	19,939	24,226	23,622
Russia		19,364	29,699	25,814	38,921	53,392
Scandinavia		215,208	625,503	211,238	384,336	528,105
Other		419,268	632,966	374,556	572,312	702,422
Total		2,279,961	3,000,879	1,792,449	2,522,070	2,834,203
Pine, planed	4407.10-121					
Canada		120,337	105,997	41,773	47,357	41,313
US		11,625	7,007	4,591	5,201	2,884
New Zealand		99,630	131,482	110,421	117,646	129,130
Russia		333,248	452,871	255,199	377,888	442,169
Scandinavia		15,146	32,184	8,640	29,813	74,052
Other		223,136	401,512	254,700	277,706	337,180
Total		803,122	1,131,053	675,324	855,611	1,026,728
Abies/Picea, planed	4407.10-129					
Canada		22,137	19,478	8,787	10,723	10,850
US		1,383	1,651	747	1,487	260
New Zealand		0	126	0	0	46
Russia		39,240	27,609	16,562	22,984	34,457
Scandinavia		597,049	759,339	508,223	830,861	843,621
Other		119,931	216,106	101,464	189,795	198,388
Total		779,740	1,024,309	635,783	1,055,850	1,087,622
SPF > 160mm	4407.10-321					
Canada			13,614	526	490	330
US			2,780	599	460	1,003
New Zealand			1,288	407	100	2,709
Scandinavia				48		78
Other						163
Total			18,225	1,661	2,117	4,283
Hemlock, planed	4407.10-322					
Canada			1,428,152	886,610	1,064,603	1,039,362
US			452,452	216,402	179,825	119,913
Scandinavia				14		
Other			28,903	14,739	18,732	23,683
Total			1,909,507	1,117,765	1,263,160	1,182,958
Product Description		1996	1997	1998	1999	2000
Douglas Fir, planed	4407.10-323					
Canada			537,738	490,454	648,552	670,329
US			531,372	293,210	326,654	333,317
New Zealand				2,006	3,872	4,321
Scandinavia			210		1,195	697
Other			20,536	10,767	16,284	31,432

Table F-1, Contd.

Product Description	HS Code	1996	1997	1998	1999	2000
Total			1,089,856	796,437	996,557	1,040,096
Planed, nes	4407.10-329					
Canada			244,964	151,010	173,125	167,593
US			29,724	11,543	9,717	6,946
New Zealand			186			1
Scandinavia			664	129	655	226
Other			63,390	49,527	58,354	51,898
Total			338,928	212,209	241,851	226,664
SW, planed, nes	4407.10-320	(This HS code discontinued after 1996)				
Canada		2,269,522				
US		1,338,754				
New Zealand		534				
Scandinavia		5,191				
Other		76,125				
Total		3,690,126				
NOT PLANED	4407.10-330					
Pine						
Canada		2,454	2,900	1,380	1,027	1,145
US		258	141	74	78	
New Zealand		152,167	146,711	106,492	119,281	111,422
Scandinavia			11		2,331	490
Other		63,814	75,485	60,686	56,333	46,140
Total		218,693	225,248	168,632	179,050	159,197
Hemlock <16cm	4407.10-371					
Canada		722,476	588,278	343,370	320,149	305,263
US		31,262	27,706	10,145	6,310	3,241
Other		13,605	12,093	6,407	7,545	10,140
Total		767,343	628,077	359,922	334,004	318,644
Hemlock >16cm	4407.10-379					
Canada		111,363	124,389	77,577	67,938	63,059
US		18,680	12,593	8,064	7,541	2,867
Other		379	329	219	188	70
Total		130,422	137,311	85,860	75,667	65,996
Product Description	4407.10-381					
Doug-Fir <16cm						
Canada		488,420	385,399	313,875	352,226	350,200
US		235,612	152,196	62,341	52,959	47,560
New Zealand		3,895	3,280	4,298	1,309	4,153
Scandinavia			43			
Other		3,482	2,999	1,146	1,807	2,060
Total		731,409	543,917	381,660	408,301	403,973
Doug-Fir >16cm	4407.10-389					
Canada		62,311	52,777	41,528	26,540	29,521
US		9,812	7,079	4,034	3,444	3,882
New Zealand		142	96	547	472	21
Other		337	149	191	320	276
Total		72,602	60,101	46,300	30,776	33,700

Table F-1, Contd.

Product Description	HS Code	1996	1997	1998	1999	2000
Total Lumber Imports						
Canada		5,882,955	5,592,204	3,794,967	4,503,983	4,515,265
US		1,732,821	1,300,052	664,177	664,213	573,264
New Zealand		282,243	334,446	244,110	266,906	275,425
Russia		405,774	522,929	310,035	458,635	554,812
Scandinavia		835,694	1,420,466	729,899	1,250,401	1,448,648
Other		974,952	1,511,929	895,913	1,228,185	1,439,019
Total		10,114,439	10,682,026	6,639,101	8,372,323	8,806,433

APPENDIX G. FORESTRY AGENCY, FOREST PRODUCTS DIVISION FORESTRY AND FOREST PRODUCTS SUBSIDIES AND SUPPORT PROGRAMS

FOREST PRODUCTS DIVISION BUDGET ITEMS

	Unit: 1,000yen
(Item) Forestry Enhancement Program	3,564,068
(Major Category) Expenses for Forestry Production and Distribution Measures	3,564,068
(Category) Forestry Production and Distribution Facilities Installation Subsidies	1,598,443
(Detail) Special Forest Products Producing Region Development Subsidies	1,437,398
(Detail) Forest Infrastructure Development Subsidies	161,045
1. Thinning Program	161,045
(1) Thinned Logs Processing Technology Development Program	161,045
(Category) Forestry Production and Distribution Enhancement Munic. Prog. Subsidies	839,021
(Detail) Forestry Production and Distribution Promotion Program Subsidies	822,019
I Forestry Region Revitalization Program	119,996
1. Special Forest Products Promotion Program ...	59,946
2. Thinning Promotion Program	60,050
(1) Thinned Logs Use Promotion Program	60,050
A. Thinned Logs Processing Technology Development Promotion Program	3,906
B. Thinned Wood Structural Use Promotion Program	56,144
(a) Thinned Wood Using Construction Promotion Program	56,144
II Forestry Successor Raising Program	90,000
1. Forestry Companies Strengthening Program	0
(1) Forestry Managers Field Trip Program	0
(2) Log Production Cooperation Promotion Program	0
(3) Forestry Companies Strengthening Funds Development Program	0
2. Basin-based Forestry Revitalization Promotion Program	90,000
(1) Basin-based Forestry Revitalization Promotion Program	90,000
A. Basin-based Log Production System Development Program	90,000
III Stable Wood Supply System Development Program	612,023
1. Basin-based Wood Products Processing and Distribution Development Program	83,988
(1) Basin-based Wood Products Processing System Development Program	50,693
(2) Stable Wood Supply Securing Plan Recognition Program	3,164
(3) Kiln-dried Wood Stable Supply System Development Program	30,131
2. Wood Demand Expansion Program	528,035
(1) Wood Demand Expansion Promotion Program	528,035
A. Low-cost Housing Materials Supply System Development Program	295,053
(a) Stable Wood Supply System Development Program	3,403
a. Low-cost Housing Materials Supply Master-Plan Development Program	3,403
(b) Low-cost Housing Materials Education Program	283,000
(c) Housing Materials Standardization Promotion Program	8,650
B. Standardized Wood Promotion Program	2,335
(a) Standardized Wood Use Promotion Program	2,335
C. Housing with Regional Wood Promotion Program	80,395
(a) Housing with Regional Wood Promotion Program	2,395
(b) Housing with Regional Wood Model House Construction Program	78,000

D. Performance-based Housing Material Program	142,252
(a) Regional Wood Performance Study Program	142,252
E. Global Warming Preventing Housing Material Use Promotion Program	8,000
(a) Housing Materials Use Development Program	8,000
F. Wood Use Promotion Program	0
(a) Housing with Regional Wood Promotion Program	0
G. Wood Housing Earthquake Resistance Improvement Emergency Program	0
(Detail) Forestry Production and Distribution Promotion and Guidance Program Subsidies	17,002
1. Prefecture Government Guidance Expenses	17,002
(1) Wood Products Industry Management Development Guidance Program	8,646
(2) Wood Products industry Development Promotion Program	8,356
(3) Log Producers foundation Strengthening Promotion Program	0
(Category) Forestry Production and Distribution Enhancement Private Organizations Program Subsidies	1,126,604
(Detail) Forestry Production and Distribution Program Promotion Subsidies	1,112,652
I Forestry Region Revitalization Program	91,416
1. Special Forest Products Promotion Program	52,240
2. Thinning Promotion Program	39,176
(1) Thinned Logs Use Promotion Program	39,176
A. Thinned Wood Structural Use Promotion Program	39,176
(a) Thinned Wood Construction Use Technology Development Program	39,176
II Stable Wood Supply System Development Program	1,021,236
1. Wood Demand Expansion Program	281,236
(1) Wood Demand Expansion Activity Promotion Program	281,236
A. Low-cost Housing Materials Supply System Development Program	69,224
(a) Housing Materials Standardization Promotion Program	30,509
(b) Low-cost Housing Materials Supply System Promotion Program	9,346
(c) Wooden Housing Materials Use Rationalization Program	29,369
B. Standardization Wood Promotion Program	25,216
C. Wood Chips Use Development Program	11,088
D. Performance-based Housing Materials Program	111,024
(a) Regional Wood Performance Evaluation Technique Promotion Program	6,407
(b) Post-and-beam Housing Material Performance Evaluation Program	32,314
(c) New Post-and-beam Housing Promotion Program	14,931
(d) Automated Lumber Production System Development Program	21,372
(e) Wooden Construction Fire Resistance Evaluation Program	36,000
E. Wood Use Technology Promotion Program	64,684
(a) Wood Use Technology Development and Promotion Program	54,296
(b) “Timber Engineer” Raising Program	4,388
(c) Global Warming Preventing Housing Materials Promotion Program	6,000
a. Housing Material Use Tech. Promotion Program	6,000
(d) Engineered Wood Performance Evaluation Program	0
F. Wooden Construction Earthquake Resistance Improvement Emergency Program	0
2. Wood Technology Promotion Program	140,000
(1) Wood Processing Technology Development Program	140,000
A. Regional Engineered Wood Development Program	110,000

(a) Hybrid Timber Production System Development Program 75,240
a. Production System Development Program 58,960
b. Efficiency Improvement Technology Development Program 16,280
(b) New-type Veneer Production System Development Program 34,760
B. Public Use of Wooden Materials Technology Development Program 30,000
C. Innovative Technology Development Promotion Program 0
D. Wood Processing Machines Development Program 0
(a) Wood Products Industry Working Environment Improvement Facilities Development Program 0
3. Wood Products Industry Modernization Program 600,000
(1) Wood Products Industry Value-added Processing Promotion Program 271,234
A. Value-added Processing Facilities introduction Promotion Special Funds Development Expenses 271,234
(2) Wood Products Industry Rearrangement Promotion Program 91,251
A. Wood Products Industry Rearrangement Special Funds Development Expenses 91,251
(3) Regional Wood Products Industry Rearrangement and Modernization Promotion Program 237,515
A. Emergency Modernization Promotion Special Funds Development Expenses 199,387
B. Emergency Rearrangement Promotion Special Funds Development Expenses 38,128
(Detail) Forestry Production and Distribution Promotion and Guidance Program Subsidies 13,952
1. Public Institutions Promotion and Guidance Program 13,952
(1) Wood Processing System Development Promotion Program 13,952
*Agricultural Technology Consortium Budget 72,810
1. Environment-friendly Wood Products Production System Technology Development 44,810
(a) Non-CAA-treated Wood Products Production System Technology Development 30,000
(b) Low-formaldehyde Radiation Plywood Production System Development 14,810
2. Biomass Energy Utilization Technology Development 28,000
(a) Wooden Energy Utilization Promotion Technology Development 28,000

Wood Distribution Division Budget Items (p.525-530)

Unit: 1,000yen

(Item) Forestry Enhancement Program 2,314,618
(Category) Forestry Production and Distribution Facilities Installation Subsidies 1,242,533
(Detail) Wood Distribution Simplification Program Subsidies 1,242,533
1. Structural Improvement Type 231,151
2. Distribution Simplification Type 450,762
3. Global Warming Prevention Processing Type 560,620
4. Wooden Public Institution Development Type 0
5. Low-cost Stable Supply Model Type 0
(Category) Forestry Production and Distribution Enhancement Municipalities Program Subsidies 436,044
(Detail) Forestry Production and Distribution Promotion Program Subsidies 399,015
I. Forestry Region Revitalization Program 9,416
1. Thinning Promotion Program 9,416
(1) Thinned Wood Use Promotion Program 9,416
A. Wooden Environment Promotion Program 9,416
(a) Thinned Wood Use Information Systemization Program 3,744
(b) Thinned Wood Use Promotion Program 5,672
II. Forestry Successor Raising Program 7,896
1. Basin-based Forestry Revitalization Program 7,896
(1) Urban Area to Production Region Distribution Modernization Promotion Program 7,896

III. Stable Wood Supply System Development Program	381,703
1. Wood Demand Expansion Program	381,703
(1) Wood Demand Expansion Promotion Program	381,703
A. Wood Use Promotion Regional Activities Program	220,457
(a) Promotion Strategy Establishment Program	6,533
(b) Regional Wood Use Promotion Program	64,813
(c) Technical Data Providing Program	13,195
(d) Regional Wood Use Proof Program	85,942
(e) Less-use Species Use Promotion Program	10,816
(f) Wood Use Consultant Activities Promotion Program	39,158
a. Wood Advisers Activities Program	26,908
b. Wood Products Direct Sales Information Provision Program	12,250
B. Housing with Regional Wood Promotion Program	41,350
(a) Housing w/ Regional Wood Activity Promotion Program	41,350
C. Wood Demand Enhancement Promotion Program	90,421
(a) Wood Demand Enhancement Promotion Program	90,421
D. Wood Distribution Revitalization Assistance Promotion Program	29,475
(Detail) Forestry Production and Distribution Promotion and Guidance Subsidies	37,029
1. Prefecture Promotion and Guidance Expenses	37,029
(1) Wood Distribution Simplification Promotion Program	22,555
(2) Wood Distribution Simplification Guidance Program	4,461
(3) Wood Demand Expansion Promotion Program	10,013
A. Domestic Wood Distribution Measures Program	6,370
B. Wood Demand Enhancement Promotion Program	3,643
(Category) Forestry Production and Distribution Enhancement Private Organizations Program Subsidies	605,261
(Detail) Forestry Production and Distribution Promotion Program Subsidies	605,261
I. Stable Wood Supply System Development Program	605,261
1. Wood Demand Expansion Program	149,897
(1) Wood Demand Expansion Promotion Program	149,897
A. Wood use Consultation and Information Provision Function Strengthening Program	103,106
(a) Wood Use Promotion Education Program	13,665
(b) Wood Communication Activities program	32,535
(c) Information Network Development Program	53,329
(d) Regional Activities Assistance Program	3,577
C. Wood Demand Enhancement Promotion Program	11,844
(a) Wood Demand Enhancement Assistance Program	11,844
C. Wood Resource Durability Improvement System Program	17,947
D. Efficient Wood Use Institution Analysis and Education Program	17,000
E. Wood Use Promotion Program	0
(a) Wood Use Promotion Strengthening Program	0
2. Wood Demand/Supply Stabilization Program	455,364
(1) Wood Distribution Promotion Program	275,049
A. Domestic Wood Supply System Awards Program	2,709
B. Forest Products Trade Stabilization Communication Enhancement Program	3,151
C. Wood Direct Distribution Promotion Program	53,676
D. Wood Distribution Rationalization Facilities Lease Promotion Program	194,984
E. Wood Certification and Labeling Research Program	10,529
(a) Wood Certification and Labeling Research Analysis Program	10,529
F. Stable Wood Supply System Development Promotion Research Program	10,000
(2) New Wood Demand/Supply Information Provision Program	180,315

A. Wood Demand/Supply Domestic Info Collection Program	18,520
(a) Wood Demand/Supply Domestic Information Collection Program	6,565
(b) Wood Demand/Supply Structural Change Research Program	5,059
(c) Wood Demand/Supply Change Emergency Research Program	6,896
B. Wood Demand/Supply Global Information Collection Program	79,864
C. Wood Demand/Supply Information Analysis Program	64,428
(a) Wood Demand/Supply Trend Analysis Program	38,672
(b) Wood Demand/Supply Information Analysis Improvement Program	25,756
D. Wood Demand/Supply Analyzed Information Provision Program	17,503
(a) Wood Demand/Supply Analyzed Information Provision Program	9,564
(b) Wood Demand/Supply Timely Information Provision Program	7,939
(Category) International Forestry Cooperation Program Subsidies	30,780
1. Forest Products Trade Trend Research Analysis Program	30,780