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The Outlook for Housing in Japan to the Year 2000

Authors

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The Outlook for Housing in Japan to the Year 2000

Reference Abstract

Ueda, Michihiko, and David R. Darr. 1980. The outlook for housing in Japan to the year 2000. USDA For. Serv. Res. Pap. PNW-276, 25 p. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

Housing demand in Japan is analyzed in terms of new household formations, vacancies, and replacements of housing stock. Total number of starts is projected to stay near current levels or decline, depending on assumptions about replacement demands. This contrasts with rapid growth in number of starts during the 1960's and early 1970's.

Keywords: Housing starts, trading policy (international), import/export (forest products), Japan.

Research Summary
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Information on the likely course of the number of housing starts in Japan in the future provides a useful, albeit only partial, data base for judging future demands by Japan for imported construction materials. In this report, the demand for new housing is assumed to be generated from three sources: formation of new households, vacancies, and replacements.

Formation of new households will decline in the future, reflecting the age distribution of the Japanese. The population has significantly more people aged 20 to 40. As this group ages, current levels for the number of new households cannot be maintained.

Vacancies, including second homes, will probably become more important in the future as a proportion of the total number of housing units. This assumption is based in part on an apparent upward trend in ownership of second homes, both as vacation villas and as condominiums for occasional use in congested metropolitan areas.

Demand for replacement housing in the future is especially difficult to project because historical data reflect replacement of substandard housing constructed in the decade after World War II. Historical data suggest that replacement demand is positively related to rates of economic growth. In recognition of this relationship and of uncertainties about the future, we projected three series of replacement demands, corresponding with low, medium, and high rates of economic growth. Under the high assumption, annual removals would rise throughout the projection period, reaching 1,035,000 units in 2000. Under the medium assumption, annual removals would generally vary between 800,000 and 900,000 units, and for the low assumption, between 700,000 and 800,000 units. The historic high was 856,000 units in 1972. These relatively high numbers of removals occur despite an assumed decline in the ratio of removals to total number of housing units. The ratio is expected to decline because of a gradual increase in the quality of housing. The number of housing units, however, is assumed to increase over time to satisfy replacement demand.

Our projections of the total number of housing starts generated by all three sources of demand depend on the rate of economic growth assumed. Under conditions of high economic growth, the total number of housing starts increases to 1.795 million units in 1987 and then declines to 1.636 million in 2000. The assumption of medium rates of economic growth results in some increase in the number of starts to 1.708 million in 1987 and then a decline to 1.465 million in 2000. Under the low assumption, the number of starts stays near current levels until 1987 and then declines to 1.289 million in 2000.

The possibility of relatively stable or declining numbers of housing starts in Japan over the next two decades contrasts sharply with the experience of the past two decades when the number of starts doubled between 1961 and 1973. The type of housing constructed in the future, the average floorspace per unit, and the volume of lumber used per unit of floorspace will influence consumption of lumber in the future and thus demand for imports. We could find little basis for doubting that historical trends in these factors will continue. Housing constructed mostly of wood will continue to decline as a proportion of housing starts, the average floorspace per housing unit will continue to increase, and the average volume of lumber consumed per unit of floorspace will probably continue to decrease. A relatively stable to declining pattern for the number of housing starts in Japan, however, would be a significant shift from the historical pattern. This possibility should be considered in judging future market prospects in Japan.

A relatively stable to declining pattern for Japanese housing starts in the future has implications for future research to judge the impact of demands by Japan on the U.S. timber supply-demand situation. Future research should concentrate more on analysis of the interactions of the United States and other sources of supply. Even with a relatively stable demand situation in Japan, there would be potential for increases or decreases in U.S. exports, depending on the situations in competing supply areas. U.S. producers interested in the Japanese market should consider the resource situations in competing supply areas when they formulate long-term marketing strategies.

Context for the Study

Information on long-term prospects for U.S. trade in timber products is essential for judging the long-term U.S. domestic timber supply-demand situation. For example, the Forest and Rangeland Renewable Resources Planning Act of 1974 (U.S. Laws, Statutes, etc. Public Law 93-378) mandates "an analysis of present and anticipated uses, demand for, and supply of the renewable resources, with consideration of the international resource situation, and an emphasis of pertinent supply and demand and price relationship trends." Economic intelligence on long-term trade prospects is also necessary for U.S. firms to formulate marketing strategies; development of export markets can be a long, expensive undertaking and needs to be guided by analysis of long-term prospects.

The purpose of this report is to present information on prospects for Japan's housing industry to the year 2000--the number and type of housing starts and average floorspace. Admittedly, information on Japan's housing industry provides only part of the information necessary to judge what the Japanese market might be for U.S. producers over the next two decades. Information is also needed on prospects for supplies to the Japanese market from competing supply areas. In 1978, 37 percent of Japan's consumption of saw logs was supplied by Japanese producers, 29 percent by the United States, 15 percent by the Soviet Union, 2 percent by New Zealand, and 17 percent by all other sources, primarily countries in Southeast Asia (Forestry Agency of Japan 1979). Increase or decrease in supplies from any competing source could affect prospects for U.S. exports.

In addition, the home construction industry accounts for only about three-fourths of the lumber used in Japan. Growth or decline in the remaining end-use industries could affect prospects for U.S. exports.

There is little doubt about the significance of housing starts in judging the prospects for U.S. markets, even though they are only a partial measure of long-term demand by Japan for U.S. timber products. The rapid rise in U.S. export of softwood logs to Japan in the 1960's and early 1970's parallels the rise in housing starts in Japan (fig. 1). Export of softwood lumber from the United States to Japan, primarily from Alaska, also increased at the time housing starts increased in Japan.

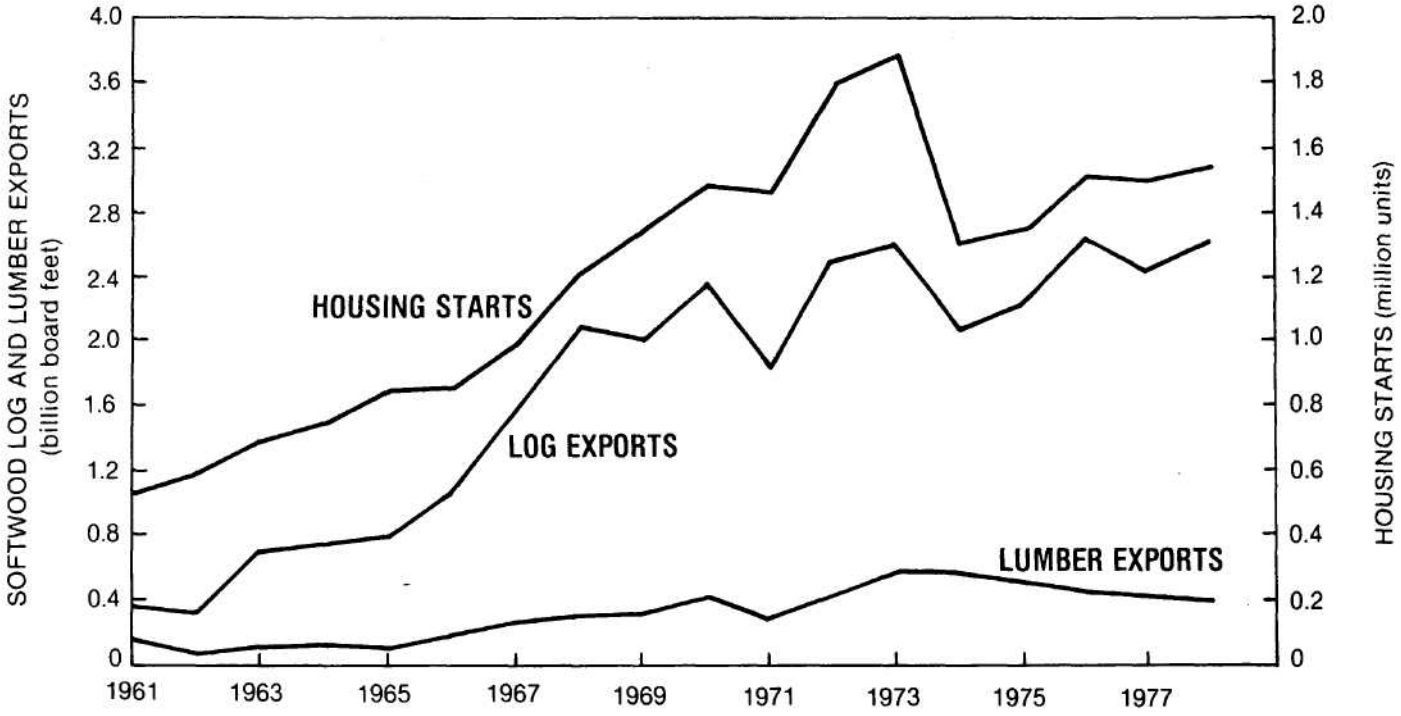

Figure 1.--Housing starts in Japan and U.S. softwood log and lumber exports to Japan, 1961-78. (Sources: U.S. Department of Commerce (monthly) and Office of Prime Minister (monthly).)

The export of logs versus lumber to Japan is another uncertainty in judging market prospects from a U.S. perspective. Rationales can be developed for an expansion of softwood lumber exports at the expense of softwood log exports; labor costs are rising more rapidly in Japan than in the United States, and this would lead to increased export of lumber. Lumber producers in the Pacific Northwest are becoming less competitive in midwestern and eastern markets of the United States. This will increase the incentive for timber processors in the Pacific Northwest to develop offshore markets, such as Japan.

Rationales can also be developed for continued export of logs. Thousands of jobs are involved in processing imported logs in Japan. Government policies in Japan are generally sensitive to issues related to employment and thus favor continued importation of logs. Sizes, grades, and standards for lumber consumed in Japan differ from those of the United States. The proximity of processors and consumers in Japan under current trade patterns facilitates marketing of lumber in Japan and is an argument for continued export of logs.

Information in this report should be interpreted as a general indicator of future demand by Japan for construction materials, regardless of the source. In interpreting this information the reader should keep in mind the additional types of information needed to judge market prospects.

General Approach to Projection of Housing Starts

The demand for new housing can be separated into three categories: formation of additional households; an inventory of vacant units for sale or rent, or held for other purposes, such as second homes; and replacement of housing units destroyed or otherwise removed from the inventory. This way of viewing the demand for new housing was developed by Marcin (1977) for use in projecting U.S. housing starts and is the approach used in this study to project housing starts in Japan.

Our projections are not based on a traditional economic framework for relating supply and demand functions for housing. Follain (1979) proposed such a framework for analysis of the longrun supply of new housing construction in the United States. The intent of our report is to point out the direction that housing starts in Japan might take in the future.

Formation of New Households

Headship Rates

In the projection of household formations, headship rates (the ratio of number of households to the number of people in the selected component of the population) are related to various components of the population, and both headship rates and population are projected to the year 2000; for example, in table 1, 39.7 percent of males aged 20-29 were heads of household in 1975.

In general, the headship rate in Japan has increased over time. This reflects in part rising standards of living which have enabled two or more families sharing a housing unit to move into separate quarters In addition, the headship rates in tables 1 and 2 probably reflect a change in life-styles in Japan. More younger (age 20-39) and older (age 60+) people are moving into separate living quarters. This contrasts with traditional family patterns of two or more generations sharing the same housing unit.

The headship rates shown in tables 1 and 2 are for all types of households, including two or more families sharing the housing unit. The total number of households is synonymous with the term "ordinary households."

The headship rates tor ordinary households were projected to 2000 by sex and age group (tables 1 and 2). In the projections, special consideration was given to the historical trend in headship rates for each group. In addition, growth in headship rates is expected to decline because of a slowdown in economic growth over the next two decades compared with the past two decades. A slowdown in economic growth would slow the tendency of families sharing a housing unit to move into separate living quarters.

Table 1—Proportion of males in Japan considered heads of households, by age group and type of household, for selected years, 1960-2000

Year	Household				Household				Household			
	All	Nuclear 1/	1 Person	Other 2/	All	Nuclear 1/	1 Person	Other 2/	All	Nuclear 1/	1 Person	Other 2/
	- - - - -Age group 20-29- - - - -				- - - - -Age group 30-39- - - - -				- - - - -Age group 40-49- - - - -			
1960	0.234	0.161	0.018	0.055	0.710	0.480	0.008	0.222	0.889	0.603	0.007	0.279
1965	.297	.202	.053	.042	.742	.547	.013	.182	.884	.608	.010	.266
1970	.334	.214	.085	.035	.773	.604	.021	.148	.883	.618	.014	.251
1975	.397	.248	.120	.029	.803	.636	.036	.131	.900	.647	.020	.233
1979	.445	.266	.153	.026	.818	.655	.045	.118	.895	.652	.024	.219
1980	.455	.270	.160	.025	.822	.660	.048	.114	.895	.655	.025	.215
1981	.465	.274	.167	.024	.826	.665	.051	.110	.896	.658	.026	.212
1982	.476	.278	.174	.024	.831	.670	.054	.107	.896	.660	.027	.209
1983	.484	.281	.180	.023	.835	.674	.057	.104	.897	.663	.028	.206
1984	.493	.284	.186	.023	.839	.678	.060	.101	.897	.665	.029	.203
1985	.501	.287	.192	.022	.844	.682	.063	.099	.898	.668	.030	.200
1986	.509	.290	.199	.022	.849	.686	.066	.097	.898	.670	.031	.197
1987	.522	.293	.202	.027	.854	.690	.069	.095	.899	.673	.032	.194
1988	.523	.295	.207	.021	.858	.693	.072	.093	.900	.675	.033	.192
1989	.528	.297	.211	.020	.864	.698	.075	.091	.902	.678	.034	.190
1990	.534	.299	.215	.020	.867	.699	.078	.090	.903	.680	.035	.188
1991	.540	.301	.219	.020	.872	.702	.081	.089	.905	.683	.036	.186
1992	.545	.303	.223	.019	.877	.705	.084	.088	.906	.685	.037	.184
1993	.550	.305	.226	.019	.882	.708	.087	.087	.908	.688	.038	.182
1994	.554	.306	.229	.019	.886	.710	.090	.086	.909	.690	.039	.180
1995	.557	.307	.232	.018	.889	.712	.092	.085	.911	.693	.040	.178
1996	.561	.308	.235	.018	.892	.714	.094	.084	.912	.695	.041	.176
1997	.563	.309	.236	.018	.895	.716	.096	.083	.915	.698	.042	.175
1998	.563	.309	.237	.017	.898	.718	0.098	.082	.916	.700	.043	.173
1999	.565	.310	.238	.017	.901	.720	0.100	.081	.918	.702	.044	.172
2000	.566	.310	.239	.017	.904	.722	0.102	.080	.902	.704	.045	.171
	- - - - -Age group 50-59- - - - -				- - - - - Age group 60+ - - - - -							
1960	0.936	0.573	0.012	0.351	0.728	0.285	0.023	0.420				
1965	.939	.623	.014	.302	.753	.337	.028	.391				
1970	.940	.644	.018	.278	.768	.388	.028	.352				
1975	.941	.638	.024	.279	.758	.430	.033	.295				
1979	.941	.640	.030	.270	.762	.470	.037	.255				
1980	.941	.641	.031	.168	.763	.480	.038	.245				
1981	.941	.642	.032	.266	.764	.488	.039	.237				
1982	.941	.643	.033	.264	.765	.496	.040	.229				
1983	.941	.644	.035	.262	.766	.504	.041	.221				
1984	.941	.645	.036	.260	.767	.512	.042	.213				
1985	.941	.646	.037	.258	.768	.520	.043	.205				
1986	.941	.647	.038	.256	.769	.526	.044	.199				
1987	.942	.648	.040	.254	.770	.532	.045	.193				
1988	.942	.649	.041	.252	.771	.538	.046	.187				
1989	.942	.650	.042	.250	.772	.544	.047	.181				
1990	.942	.651	.043	.248	.773	.550	.048	.175				
1991	.943	.652	.045	.246	.774	.554	.049	.171				
1992	.943	.653	.046	.244	.775	.558	.050	.167				
1993	.943	.654	.047	.242	.776	.562	.051	.163				
1994	.943	.655	.048	.240	.777	.566	.052	.159				
1995	.944	.656	.050	.238	.778	.570	.053	.155				
1996	.944	.657	.051	.236	.780	.573	.054	.153				
1997	.944	.658	.052	.234	.782	.576	.055	.151				
1998	.944	.659	.053	.232	.784	.579	.056	.149				
1999	.945	.660	.055	.230	.786	.582	.057	.147				
2000	.945	.661	.056	.228	.788	.585	.058	.145				

1/Household consists of a married couple only, married couple and children, father arid children, or mother and children.

2/Head of household lives with people other than spouse or children.

Source: Office of Prime Minister (1961, 1966, 1971, 1976).

Table 2--Proportion of females in Japan considered heads of households, by age group and type of household, for selected years, 1960-2000

Year	Household				Household				Household			
	All	Nuclear[1/]	1 Person	Other[2/]	All	Nuclear[1/]	1 Person	Other[2/]	All	Nuclear[1/]	1 Person	Other[2/]
	- - - - -Age group 20-29- - - - -				- - - - -Age group 30-39- - - - -				- - - - -Age group 40-49- - - - -			
1960	0.021	0.006	0.008	0.007	0.058	0.034	0.009	0.015	0.157	0.103	0.017	0.037
1965	.039	.007	.024	.008	.057	.029	.018	.010	.134	.083	.025	.026
1970	.051	.006	.036	.009	.054	.026	.021	.007	.118	.067	.030	.021
1975	.068	.006	.053	.009	.056	.027	.023	.006	.107	.058	.033	.016
1979	.077	.006	.062	.009	.057	.027	.025	.005	.104	.055	.036	.013
1980	.079	.006	.064	.009	.058	.028	.025	.005	.103	.054	.036	.013
1981	.081	.006	.066	.009	.059	.028	.026	.005	.103	.054	.037	.012
1982	.083	.006	.068	.009	.059	.028	.026	.005	.103	.054	.037	.012
1983	.085	.006	.070	.009	.060	.029	.026	.005	.103	.054	.037	.012
1984	.087	.006	.072	.009	.061	.029	.027	.005	.103	.054	.038	.011
1985	.089	.006	.074	.009	.061	.029	.027	.005	.102	.053	.038	.011
1986	.091	.006	.076	.009	.062	.030	.027	.005	.102	.053	.038	.011
1987	.092	.006	.077	.009	.063	.030	.028	.005	.103	.053	.039	.011
1988	.093	.006	.078	.009	.063	.030	.028	.005	.103	.053	.039	.011
1989	.095	.006	.080	.009	.064	.031	.028	.005	.103	.053	.039	.011
1990	.096	.006	.081	.009	.065	.031	.029	.005	.103	.053	.040	.010
1991	.098	.006	.083	.009	.065	.031	.029	.005	.102	.052	.040	.010
1992	.099	.006	.084	.009	.066	.032	.029	.005	.102	.052	.040	.010
1993	.100	.006	.085	.009	.067	.032	.030	.005	.102	.052	.040	.010
1994	.101	.006	.086	.009	.067	.032	.030	.005	.102	.052	.040	.010
1995	.102	.006	.087	.009	.069	.033	.031	.005	.103	.052	.041	.010
1996	.103	.006	.088	.009	.069	.033	.031	.005	.103	.052	.041	.010
1997	.103	.006	.088	.009	.070	.033	.032	.005	.103	.052	.041	.010
1998	.104	.006	.089	.009	.071	.034	.032	.005	.103	.052	.041	.010
1999	.104	.006	.089	.009	.072	.034	.033	.005	.103	.052	.041	.010
2000	.105	.006	.090	.009	.072	.034	.033	.005	.103	.052	.041	.010
	- - - - -Age group 50-59- - - - -				- - - - - Age group 60+ - - - - -							
1960	0.161	0.086	0.027	0.048	0.115	0.029	0.043	0.043				
1965	.184	.091	.039	.054	.128	.032	.055	.041				
1970	.190	.086	.054	.050	.148	.036	.070	.042				
1975	.173	.071	.066	.036	.163	.036	.090	.037				
1979	.182	.076	.076	.030	.171	.036	.102	.033				
1980	.184	.075	.079	.030	.173	.036	.105	.032				
1981	.184	.074	.081	.029	.175	.036	.180	.031				
1982	.185	.073	.083	.029	.178	.037	.111	.030				
1983	.185	.072	.085	.028	.181	.037	.114	.030				
1984	.186	.071	.087	.028	.183	.037	.117	.029				
1985	.187	.071	.089	.027	.187	.039	.120	.029				
1986	.188	.070	.091	.027	.189	.038	.123	.028				
1987	.188	.070	.092	.026	.192	.038	.126	.028				
1988	.189	.069	.094	.026	.194	.038	.129	.027				
1989	.190	.069	.095	.026	.197	.038	.132	.027				
1990	.190	.068	.097	.025	.200	.039	.135	.026				
1991	.192	.068	.099	.025	.201	.039	.136	.026				
1992	.192	.067	.100	.025	.202	.039	.138	.025				
1993	.192	.067	.101	.024	.203	.039	.139	.025				
1994	.192	.066	.102	.024	.204	.039	.141	.024				
1995	.193	.066	.103	.024	.205	.039	.142	.024				
1996	.193	.066	.104	.023	.206	.039	.143	.024				
1997	.194	.066	.105	.023	.207	.040	.144	.023				
1998	.194	.065	.106	.023	.208	.040	.145	.023				
1999	.195	.065	.107	.023	.209	.040	.146	.023				
2000	.195	.065	.108	.022	.209	.040	.147	.022				

1/ Household consists of a married couple only, married couple and children, father and children, or mother and children.

2/ Head of household lives with people other than spouse or children.

Source: Office of Prime Minister (1961, 1966, 1971, 1976).

Other projection techniques, such as relating headship rates to gross national product, were not tried because only four data points were available (1960, 1965, 1970, and 1975) and because some factors affecting formation of households in the 1960's and early 1970's were probably unique to that period. For example, the doubling up of families in the same dwelling unit in the 1950's and 1960's was probably due to economic need as well as tradition. In the future, tradition will probably be more important as a variable explaining continued doubling of generations of the same family.

In tables 1 and 2, a nuclear household is defined as one of the following types: Married couple only, married couple and children, father and children, or mother and children. Other household is the head of the household living with people or another person other than spouse or children. The number of other households indicates the potential for movement of families sharing a single housing unit into separate living quarters.

Headship rates for nuclear, 1-person, and other households are projected separately to account for an expected divergence of trends. In general, our projections indicate that headship rates for both males and females of all age groups will increase for nuclear and 1-person households. Headship rates for both males and females of all age groups are generally expected to decline for other households, reflecting the movement of families into separate housing units.

Needed in addition to projections of headship rates to determine the number of household formations are projections for population by sex and age group.

Population Projections

Our projections of the population of Japan by sex and age group are based on data published by the Institute of Population Problems (IPPR) of the Ministry of Health and Welfare (table 3). The IPPR publishes low, medium, and high estimates of population. The data in table 3 are the medium projections. As shown in figure 2, there is currently a bulge in the Japanese population in the age group of 20-40 years. By 2000, many of the people in this category will be over 50. The structure of the population by age group influences the pattern of housing starts over time; the age group 20-40 is typically the time of marriage and household formation in Japan.

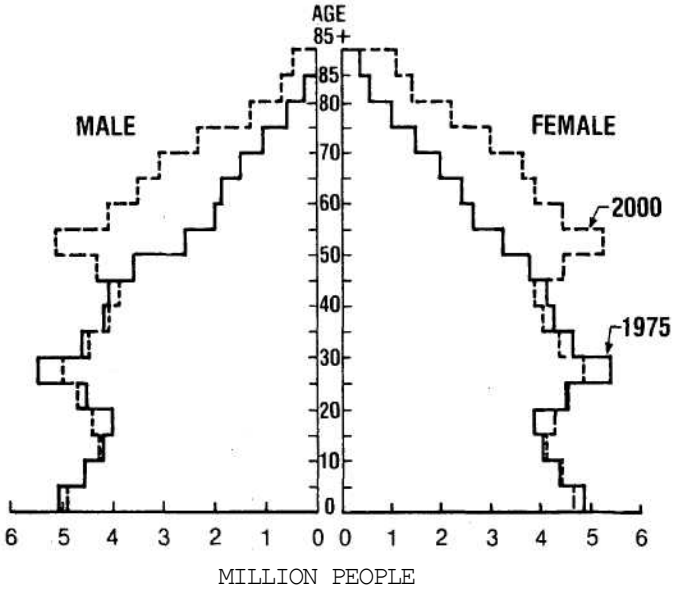

Figure 2.—Age structure of the population of Japan, by sex, 1975 and 2000. (Source: Institute of population problems (1976).

Table 3--Population of Japan, by age group, 1979-2000

(1,000 people)

Year	Age group					
	Total	20-29	30-39	40-49	50-59	60+
1979	80,252	17,583	19,571	16,282	12,402	14,414
1980	81,081	16,935	20,034	16,441	12,822	14,849
1981	81,889	16,476	20,117	16,755	13,317	15,224
1982	82,674	16,119	20,093	17,005	13,808	15,649
1983	83,545	16,008	19,969	17,195	14,262	16,111
1984	84,410	15,985	19,699	17,484	14,600	16,642
1985	85,385	16,083	19,784	17,369	14,895	17,254
1986	86,010	15,937	19,902	17,072	15,180	17,919
1987	87,000	16,251	19,118	17,630	15,454	18,547
1988	87,945	16,516	18,271	18,348	15,601	19,209
1989	88,910	16,773	17,436	19,244	15,590	19,867
1990	89,886	17,112	16,796	19,704	15,747	20,527
1991	90,866	17,493	16,343	19,789	16,053	21,188
1992	91,887	17,954	15,991	19,767	16,298	21,877
1993	92,881	18,319	15,882	19,646	16,485	22,549
1994	93,829	18,665	15,860	19,379	16,764	23,161
1995	94,624	18,765	15,958	19,458	16,650	23,793
1996	95,340	19,152	15,813	19,565	16,362	24,448
1997	95,991	19,114	16,125	18,792	16,505	25,055
1998	96,668	19,141	16,387	17,961	17,599	25,580
1999	97,354	19,158	16,644	17,143	18,459	25,950
2000	97,995	19,121	16,979	16,516	18,900	26,479

Source: Institute of Population Problems (1976).

The data in tables 1-5 refer to headship rates and population for people aged 20 or over. In the past two decades, there has been an increase in the number of households headed by people in the nonadult (15-19) age groups (table 6). As shown in table 6, we expect some increase in the headship rate for this group and an increase in the number of households headed by people aged 15-19. Detailed data by type of household were not available for this age group. The overall rate of attendance at high schools and colleges is still rising, and this should dampen the rate of household formation in the 15-19 age group. In our projections, we applied the headship rates from table 6 to projections of population for ages 15-19 to calculate the number of household formations for this age group.

Projections of Number of Households

We multiplied the headship rates in tables 1 and 2 by the population data in tables 3, 4, and 5 for corresponding years by sex and age group to calculate the number of adult households shown in column 1 of table 7. The basis for the number of nonadult households shown in column 2 was discussed previously. The total number of households of all types shown in column 3. The change in the number of new households is shown in column 4. In general, the projection of formation of new households shows a downward trend, reflecting in part the expected profile of the Japanese population by age group over the coming two decades.

Linkage of Number of Households and Number of Housing Units

In Japanese surveys, if a single household occupies a housing unit, the household is defined as a principal household. If two or more households are living together in a housing unit, the owner is defined as the principal householder. If there is no owner-occupant when two or more households live together, the chief lessee is defined as the principal householder. The number of principal households is thus synonymous with the number of occupied housing units. The ratio of the number of principal households to the number of total households (the principal household rate) increased from 1958 to 1978 (table 8). We expect this trend to continue for the next two decades. By 2000, for example, our projections indicate that 98.2 percent of all households will be classified as principal households. In 2000, the number of occupied housing units will total 46,006,000.

As shown in table 8, the number of housing units attributable to the formation of new households declines gradually over the projection period.

Table 4--Female population of Japan, by age group, 1979-2000

(1,000 people)

Year	Age group					
	Total	20-29	30-39	40-49	50-59	60+
1979	41,412	8,698	9,750	8,135	6,592	8,237
1980	41,831	8,368	9,875	8,227	9,737	8,524
1981	42,232	8,112	10,023	8,392	6,919	8,786
1982	42,633	7,924	10,005	8,541	7,085	9,078
1983	43,075	7,851	9,931	8,653	7,263	9,377
1984	43,510	7,838	9,789	8,800	7,297	9,686
1985	44,001	7,882	9,832	8,731	7,541	10,015
1986	44,328	7,819	9,887	8,568	7,682	10,372
1987	44,758	7,969	9,426	8,849	7,809	10,705
1988	45,287	8,098	9,069	9,186	7,888	11,046
1989	45,762	8,211	8,645	9,631	7,891	11,384
1990	46,246	8,375	8,318	9,855	7,982	11,716
1991	46,744	8,582	8,065	9,903	8,144	12,050
1992	47,260	8,810	7,880	9,884	8,290	12,396
1993	47,750	8,986	7,807	9,813	8,401	12,743
1994	48,204	9,142	7,795	9,671	8,544	13,052
1995	48,600	9,188	7,839	9,713	8,476	13,384
1996	48,952	9,367	7,777	9,763	8,317	13,727
1997	49,269	9,347	7,925	9,370	8,593	14,034
1998	49,600	9,362	8,052	8,956	8,921	14,309
1999	49,935	9,372	8,168	8,538	9,353	14,504
2000	50,246	9,353	8,330	8,216	9,570	14,777

Table 5--Male population of Japan, by age group, 1979-2000

(1 ,000 people)

Year	Age group					
	Total	20-29	30-39	40-49	50-59	60+
1979	38,840	8,885	9,821	8,147	5,810	6,177
1980	39,250	8,567	10,059	8,214	6,085	6,325
1981	39,657	8,364	10,094	8,363	6,398	6,438
1982	40,041	8,195	10,088	8,464	6,723	6,571
1983	40,470	8,157	10,038	8,542	6,999	6,734
1984	40,900	8,147	9,910	8,684	7,203	6,956
1985	41,384	8,201	9,952	8,638	7,354	7,239
1986	41,682	8,118	10,015	8,504	7,498	7,547
1987	42,242	8,282	9,692	8,781	7,645	7,842
1988	42,658	8,418	9,202	9,162	7,713	8,163
1989	43,148	8,562	8,791	9,613	7,699	8,483
1990	43,640	8,737	8,478	9,849	7,765	8,811
1991	44,122	8,911	8,278	9,886	7,909	9,138
1992	44,627	9,144	8,111	9,883	8,008	9,481
1993	45,131	9,333	8,075	9,833	8,084	9,806
1994	45,625	9,523	8,065	9,708	8,220	10,109
1995	46,024	9,577	8,119	9,745	8,174	10,409
1996	46,388	9,785	8,036	9,801	8,045	10,721
1997	46,722	9,767	8,200	9,422	8,312	11,021
1998	47,068	9,779	8,335	9,005	8,678	11,271
1999	47,419	9,786	8,476	8,605	9,106	11,446
2000	47,749	9,768	8,649	8,300	9,330	11,702

Source: Institute of Population Problems (1976).

Table 6--Number of households in Japan and headship rate for age group 15-19, selected years, 1960-2000

Year	Households	Headship rate
1960	46,000	0.010
1965	103,000	.019
1970	211,000	.023
1975	254,000	.032
1980	305,000	.037
1985	375,000	.042
1990	446,000	.045
1995	441,000	.047
2000	436,000	.050

Sources: Office of Prime Minister (1961, 1966, 1971, 1976).

Table 7--Number of households in Japan, by type, and change in number of households, 1979-2000

(In thousands)

Year	Adult (1)	Nonadult (2)	Total (3)	Change in number of new households (4)
1979	34,127	290	34,417	759
1980	34,865	305	35,170	753
1981	35,576	309	35,885	715
1982	36,268	328	36,596	711
1983	36,932	343	37,275	679
1984	37,549	361	37,910	635
1985	38,220	375	38,595	685
1986	38,734	406	39,140	545
1987	39,496	418	39,914	774
1988	40,007	432	40,439	525
1989	40,656	443	41,099	660
1990	41,255	446	41,701	602
1991	41,869	446	42,315	614
1992	42,446	441	42,887	572
1993	43,039	438	43,477	590
1994	43,587	437	44,024	547
1995	44,102	441	44,543	519
1996	44,493	446	44,939	396
1997	44,979	449	45,428	489
1998	45,442	447	45,889	461
1999	45,964	442	46,406	517
2000	46,404	436	46,840	434

Table 8--Number of ordinary households, principal household rate, and number of occupied housing units in Japan, 1958-2000, and change in number of occupied housing units, 1979-2000

Year	Ordinary households (1,000)	Principal household	Occupied units (1,000)	Year	Ordinary households (1,000)	Principal household	Occupied units (1,000)	Change in number of units (1,000)
1958	18,537	0.94034	17,431	1979	34,417	0.96434	33,190	761
1959	19,021	.94119	17,902	1980	35,170	.96519	33,946	756
1960	19,571	.94204	18,437	1981	35,885	.96604	34,666	720
1961	20,175	.94289	19,023	1982	36,596	.96689	35,384	718
1962	20,848	.94374	19,675	1983	37,275	.96774	36,073	689
1963	21,567	.94459	20,372	1984	37,910	.96859	36,719	646
1964	22,360	.94748	21,186	1985	38,595	.96944	37,416	697
1965	23,117	.95036	21,969	1986	39,140	.97029	37,977	561
1966	23,812	.95325	22,699	1987	39,914	.97114	38,762	785
1967	24,478	.95613	23,404	1988	40,439	.97199	39,306	544
1968	25,232	.95902	24,198	1989	41,099	.97284	39,983	677
1969	26,087	.96064	25,060	1990	41,701	.97369	40,604	621
1970	26,841	.96226	25,828	1991	42,315	.97454	41,238	634
1971	27,788	.96387	26,784	1992	42,887	.97359	41,832	594
1972	28,710	.96549	27,719	1993	43,477	.97624	42,444	612
1973	29,707	.96711	28,730	1994	44,024	.97709	43,015	571
1974	30,407	.96639	28,385	1995	44,543	.97794	43,560	545
1975	31,311	.96566	30,236	1996	44,939	.97879	43,986	426
1976	32,102	.96494	30,977	1997	45,428	.97964	44,503	517
1977	32,886	.96421	31,709	1998	45,889	.98049	44,994	491
1978	33,658	.96349	32,429	1999	46,406	.98134	45,540	546
				2000	46,840	.98219	46,006	466

Source: Office of Prime Minister (1959, 1961, 1964, 1966, 1969, 1971, 1974, 1976, 1979).

Vacancy Rates

Data on vacancy rates in Japan are limited to housing surveys published by the Office of Prime Minister (1959, 1964, 1969, 1974, 1979). These surveys classify unoccupied housing units as:

1. Housing under construction; i.e., the framework has been set up, but con struction has not been completed.

2. Housing used temporarily; i.e., units that have no resident but are used only in the daytime or alternatively by several persons.

3. Vacant housing units; i.e., where no person lives.

Data for the numbers of units for each category in the housing surveys are shown in table 9. In 1978, housing under construction amounted to 0.7 percent of the total housing units; units used temporarily, 0.9 percent; vacant units, 7.6 percent; and total unoccupied housing of all types amounted to 9.2 percent.

Projections of vacancy rates by type of housing unit are also shown in table 9. We used the rationales in the following discussions to make these projections.

Housing Under Construction

The number of housing units under construction increased from 75,000 in 1958 to 258,300 in 1978, corresponding with an increase in housing starts. The number of units under construction has amounted to about 15 percent of the total number of starts in recent years, and this percentage has been relatively stable. We have assumed that the number of units under construction will continue at about 15 percent of starts over the next two decades. Since the number of starts is projected to be relatively stable and the total number of housing units is expected to increase, the ratio of units under construction to the total number of housing units is expected to decline over time, reaching 0.4 percent in 2000.

Housing Units Used Temporarily

Dwellings used temporarily include houses used only in daytime or nighttime, such as houses for security guards, or a combination store-dwelling unit where the living quarters are no longer used. We have assumed that, in the future, housing used temporarily will amount to 0.8 percent of the total number of housing units. This allows for some increase in the number of these units but also limits the rate of increase in line with recent trends.

Table 9--Vacancy rate by type of housing in Japan, for selected years, 1958-2000

(Percent of total housing units)

Year	Under construction	Used temporarily	Vacant				Total
			Total	Decrepit	Second homes	Inventory and buffer 1/	
1958	0.4	0.4	2.0	2/	2/	2/	2.8
1963	.6	.4	2.5	2/	2/	2/	3.5
1968	.7	.7	4.0	2/	2/	2/	5.4
1973	.9	1.1	5.5	2/	2/	2/	7.5
1978	.7	.9	7.6	2/	2/	2/	9.2
1979	.7	.8	7.6	1.7	0.4	5.5	9.1
1980	.7	.8	7.7	1.7	.4	5.6	9.2
1981	.7	.8	7.9	1.7	.5	5.7	9.3
1982	.7	.8	8.1	1.7	.6	5.8	9.5
1983	.6	.8	8.2	1.6	.7	5.9	9.6
1984	.6	.8	8.4	1.6	.8	6.0	9.8
1985	.6	.8	8.5	1.6	.8	6.1	9.9
1986	.6	.8	8.7	1.6	.9	6.2	10.1
1987	.6	.8	8.8	1.6	.9	6.3	10.2
1988	.5	.8	8.9	1.5	1.0	6.4	10.2
1989	.5	.8	9.0	1.5	1.0	6.5	10.3
1990	.5	.8	9.1	1.5	1.1	6.5	10.4
1991	.5	.8	9.2	1.5	1.1	6.6	10.5
1992	.5	.8	9.3	1.5	1.2	6.6	10.6
1993	.4	.8	9.3	1.4	1.2	6.7	10.5
1994	.4	.8	9.4	1.4	1.3	6.7	10.6
1995	.4	.8	9.5	1.4	1.3	6.8	10.7
1996	.4	.8	9.5	1.4	1.3	6.8	10.7
1997	.4	.8	9.7	1.4	1.4	6.9	10.9
1998	.4	.8	9.7	1.4	1.4	6.9	10.9
1999	.4	.8	9.7	1.4	1.4	6.9	10.9
2000	.4	.8	9.9	1.4	1.5	7.0	11.1

1/ Number of housing units needed as inventory for real estate transactions and as a buffer for migration of regional populations.

2/Not available.

Source: Office of Prime Minister (1959,1964, 1969, 1974, 1979).

Vacant Units

The number of vacant housing units increas- from 360,000 in 1958 to 2.7 million in 1978. Vacant units can be classified as:

1. Housing abandoned because of decrepi- tude or poor condition.

2. Second homes, such as vacation villas and condominiums, used occasionally for business purposes.

3. Housing units needed as inventory for real estate transactions and as a buffer for migration of regional populations.

Over time, we expect the number of housing units abandoned because of decrepitude to decrease relative to the total number of housing units, reflecting a gradual improve- ment in the quality of housing. Conse- quently, the ratio of decrepit houses to the total number of housing units is projected to decline to 1.4 by 2000.

The demand for second homes is expected to increase over time, reflecting in part aging of the current population in the 20-40 year group. As these people grow older, financial independence will increase interest in second homes. In addition, increasing congestion in the metropolitan areas will increase interest in condomin- iums for occasional business use. Thus, we projected the number of second homes as a percent of the total number of housing units to increase to 1.5 in 2000.

Vacant housing units needed as inventory for real estate transactions and as a buffer for migration of regional populations have increased in importance relative to total housing units, from 2 percent in 1958 to 5.5 percent in 1978. We expect continued increase in the proportion of housing units needed for inventory and buffer purposes, but we expect the rate of increase to slow. We project the number of units of this type expressed as a percentage of total number of housing units to increase from 5.5 percent in 1978 to 7 percent in 2000.

The vacancy rate for unoccupied housing of all types is projected to increase from 9.2 percent in 1978 to 11.1 percent in 2000.

Linkage of Vacancies and the Total Number of Housing Units

We combined the estimates of the total number of occupied housing units in table 8 with the rates of vacancy in table 9 to project the annual changes in total housing units shown in table 10. To take into account the effect of the vacancy rate on the total number of housing units, we divided the data for the total number of occupied housing units in column 1 by (100 minus vacancy rate) for corresponding years to derive estimates of the total number of housing units shown in column 2. The change in the total number of housing units attributable to formation of new households and vacancies is projected to decline from 872,000 in 1980 to 639,000 in 2000.

The net decline in housing starts attributable to household formations and vacancies is due to household formations. The number of starts attributable to vacancies generally varies between 100,000 and 200,000 throughout the projection period.

The remaining demand for new housing units is for replacement.

Table 10--Number of occupied housing units in Japan, total housing units, and changes in numbers, 1980-2000

(1,000 units)

Year	Occupied houses (1)	Total housing units (2)	Changes		
			Total (3)	New households (4)	Vacancies (5)
1980	33,946	37,385	872	756	116
1981	34,666	38,221	836	720	116
1982	35,384	39,098	877	718	159
1983	36,073	39,904	806	689	117
1984	36,719	40,708	804	646	158
1985	37,416	41,527	819	697	122
1986	37,977	42,244	717	561	156
1987	38,762	43,165	921	785	136
1988	39,306	43,771	606	544	62
1989	39,983	44,547	803	677	126
1990	40,604	45,317	743	621	122
1991	41,238	46,076	759	634	125
1992	41,832	46,792	716	594	122
1993	42,444	47,423	631	612	19
1994	43,015	48,115	692	571	121
1995	43,560	48,779	664	545	119
1996	43,986	49,256	477	426	31
1997	44,503	49,947	691	517	174
1998	44,994	50,498	551	491	60
1999	45,540	51,111	613	546	67
2000	46,006	51,750	639	466	173

Demand for Replacement Housing

As shown in table 11, the ratio of removals to the total number of housing units expressed as a percentage varied over the period 1961-77 from a low of 1.4 in 1965 to a high of 2.94 in 1970. The total number of annual removals generally increased to a peak of 856,000 in 1972; since then, the number has fluctuated. The potential importance of removals in estimating future demand for housing is indicated by comparison of historical data for removals and housing starts; for example, in 1973, the peak year for housing starts in Japan, demand for replacement amounted to about 45 percent of new starts.

Demand for replacement housing is tied in part to economic conditions in Japan. The rise in the number of removals in the late 1960's and early 1970's corresponds with rising standards of living and rapid rates of economic growth. The drop in demand for replacement in 1974 and 1975 corresponds with a recessionary period. In the late 1960's and early 1970's, housing units that were replaced were made up in large part of low-quality units constructed in the 10 years after World War II.

Table 11--Number of housing units in Japan, removals, and percent removed, 1961-77

Year	Housing units (1,000)	Housing units removed (1,000)	Percent removed
1961	19,644	363	1.85
1962	20,342	333	1.65
1963	21,090	403	1.91
1964	21,984	392	1.78
1965	22,937	320	1.40
1966	23,798	382	1.61
1967	24,644	531	2.15
1968	25,591	652	2.55
1969	26,580	708	2.66
1970	27,553	809	2.94
1971	28,701	521	1.82
1972	29,834	856	2.87
1973	31,059	851	2.74
1974	31,947	533	1.67
1975	32,915	483	1.47
1976	33,858	672	1.98
1977	34,784	657	1.89

Source: Based on data from Office of Prime Minister (1959, 1964, 1969, 1974, 1979).

A key in estimating demand for replacement to the year 2000 is to estimate how long houses built in the last two decades will last. From 1961 to 1977, the number of housing units in Japan increased by 77 percent. There are examples of houses in Japan lasting over 100 years. There are also examples of houses lasting fewer than 10 years. Available inventory data on the age of housing suggests that housing built in the 1960's and 1970's has gradually increased in quality and more years of service are expected before removal.

A second key in estimating future demand for replacement is the linkage between economic conditions and replacement demand; historical data suggest this type of linkage. We considered the historical relationship not appropriate for long-term projections, however. The gross national product of Japan will undoubtedly continue to increase over the next two decades, indicating rising demands for replacement housing. The quality of the housing units will probably be continually upgraded over time, however, and this will temper demand for replacement.

There seems little doubt that gross national product and other measures of economic growth will continue to increase in Japan, but there is much uncertainty about the rate of increase. Because of this uncertainty, we have projected low, medium, and high estimates of the ratio of removals to the total number of housing units (table 12). These estimates correspond with low, medium, and high estimates of economic growth. The three trends of ratio of the removal to the total number of housing units have been projected on a judgmental basis. No quantitative linkages among removals, housing units, and economic conditions were explicitly considered. The size of the ratio for the low projection corresponds roughly with the size of the ratio in the 1974-75 period, the medium projection is roughly a continuation of the trend for 1976-79, and the size of the ratio for the high projection corresponds roughly with the size of the ratio in the late 1960's and early 1970's.

All three trends have built into them an increase in the ratio of removals to total number of housing units in the early 1980's. This reflects our judgment that some replacement demand has probably built up in the years since the 1974-75 recession. The economy in Japan has been slow to recover from the recession, undoubtedly thwarting some replacement demand. After 1984, we expect the ratio of removals to total number of housing units to decline gradually to 2000 for all three projections, reflecting an assumed gradual improvement in the quality of the housing units. Marcin (1977) found considerable variation in U.S. replacement demand over time.

Table 12--Replacement rates and number of housing units in Japan replaced by high, medium, and low rates of economic growth, 1980-2000

Year	Replacement rate, by rate of economic growth			Number of units (1,000), by rate of economic growth		
	High	Medium	Low	High	Medium	Low
1980	2.10	2.00	1.90	785	748	710
1981	2.19	2.07	1.95	837	791	745
1982	2.30	2.15	2.00	899	841	782
1983	2.30	2.15	2.00	918	858	798
1984	2.30	2.15	2.00	936	875	814
1985	2.28	2.12	1.95	947	880	810
1986	2.26	2.09	1.90	955	883	803
1987	2.24	2.06	1.87	976	889	807
1988	2.22	2.03	1.83	972	875	801
1989	2.21	2.00	1.78	984	891	793
1990	2.19	1.97	1.74	992	893	789
1991	2.17	1.94	1.70	1,000	894	783
1992	2.15	1.91	1.66	1.006	894	777
1993	2.13	1.88	1.62	1,010	892	768
1994	2.11	1.85	1.58	1,015	890	760
1995	2.09	1.82	1.54	1,019	888	751
1996	2.07	1.79	1.50	1,020	882	739
1997	2.06	1.76	1.45	1,029	879	724
1998	2.04	1.73	1.41	1,030	874	712
1999	2.02	1.70	1.37	1,032	869	700
2000	2.00	1.67	1.33	1,035	864	688

Summary of Projections of Housing Starts

We multiplied the replacement rates in table 12 by the estimates for housing units in table 10 for corresponding years to generate the number of housing starts attributable to housing units replaced shown in the last three columns of table 12. Under the low projection, the total number of housing units demanded in the form of replacements would generally be between 700,000 and 800,000 for each year of the projection period. For the medium projection, replacement demand would amount to 800,000 to 900,000 units per year; and for the high projection, from about 800,000 to over 1,000,000 units by 2000.

Even under the low projection, the number of housing units attributable to replacement demand is almost the same as in 1969, 1970, 1972, and 1973--peak years by historical standards. This occurs despite a relatively low, declining ratio of removals to total number of housing units. The number of housing units is continuously increasing over time, accounting for this apparent anomaly. We again emphasize that there are few data available to judge how long houses built in Japan since the 1950's will last. If these houses are durable--lasting 25 or more years on the average--the replacement demands shown in table 12 are probably too high.

As shown in table 13, projections of total housing starts depend on what is assumed about the rate of replacement of housing units. Under a high rate of removal, housing starts increase from current levels to a peak of 1,795,000 units in 1987 and then decline to about current levels by 2000. For a medium rate of removal, housing starts initially increase to a peak of 1,708,000 in 1987 and then decline below current levels in 2000. For a low rate of removal, housing starts stay near current levels until the early 1990's and then decline to 1,289,000 units in 2000. Keep in mind that we have arbitrarily assumed replacement demand to be somewhat higher in the early 1980's in light of probably pent-up demand for replacement that has developed since the 1974-75 recession.

Table 13--Number of housing starts in Japan by source of demand

(1,000 units)

Year	Source of demand							
	Formation of new households	Vacancies	Removals, by rate of economic growth			Total, by rate of economic growth		
			High	Medium	Low	High	Medium	Low
1980	756	116	785	748	710	1,652	1,605	1,577
1981	720	116	837	791	745	1,676	1,630	1,584
1982	718	159	899	841	782	1,761	1,703	1,644
1983	689	117	918	858	798	1,758	1,698	1,638
1984	646	158	936	875	814	1,765	1,704	1,643
1985	697	122	947	880	810	1,757	1,690	1,620
1986	561	156	955	883	803	1,735	1,663	1,583
1987	785	136	976	889	807	1,795	1,708	1,626
1988	544	62	972	875	801	1,720	1,623	1,549
1989	677	126	984	891	793	1,761	1,668	1,570
1990	621	122	992	893	789	1,709	1,610	1,506
1991	634	125	1,000	894	783	1,768	1,662	1,551
1992	594	122	1,006	894	777	1,745	1,633	1,516
1993	612	19	1,010	892	768	1,712	1,594	1,470
1994	571	121	1,015	890	760	1,695	1,570	1,440
1995	545	119	1,019	888	751	1,681	1,550	1,413
1996	426	51	1,020	882	739	1,631	1,493	1,350
1997	517	174	1,029	879	724	1,640	1,490	1,335
1998	491	60	1,030	874	712	1,603	1,447	1,285
1999	546	67	1,032	869	700	1,650	1,487	1,318
2000	466	173	1,035	864	688	1,636	1,465	1,289

Replacement demand under a low rate of removal generally accounts for about one-half of total housing starts. Under a high rate of removal, replacement demand accounts for over 60 percent of total housing starts by 2000. Of the three types of housing demand discussed in this report--formation of new households, vacancies, and replacements—we feel less confident about our projections of replacement demand. The projections of new household formation are based on the demographic characteristics of the population in Japan. The detailed historical information available for headship rates by sex and age group, along with population projections by sex and age group, provide a reasonable basis for projecting formation of new households. Sharp shifts in demographic patterns are probably not likely. Vacancy rates are factors determining new housing starts, but their influence is relatively small compared with new household formation and replacement demand. Errors in the projection of vacancy rates would not have much effect on projections of housing starts.

Historical data on removals of housing units in Japan reflect the post-World War II experience in upgrading substandard housing constructed in the decade following the war. Removal rates exceeded 2 percent in the late 1960's and early 1970's. By contrast, Marcin (1977) estimated the removal rate for the United States to be 1 percent or less. Our projections of removals in Japan are based in part on historical data, possibly causing an upward bias on our estimates of removal demands for all three projections. As discussed in the next section, however, the desire to upgrade housing is evident in the gradual increase in the average size of housing units. This desire to continually upgrade housing may result in demands for replacement housing occurring as we project.

Regardless of whether removals are assumed to occur at low, medium, or high levels, our projections indicate that the period of rapid increase in the number of housing starts in Japan is over. Even under the assumption of relatively high rates of economic growth, housing starts never exceed 1.8 million units in any year to 2000. If, as expected, future rates of economic growth are relatively low by the standards of the 1960's and early 1970's, housing starts will stay near current levels and may decline. Thus, the Japanese market for imported construction materials over the next two decades will likely be much different than for the past two decades. Rather than experiencing increased sales because of rising demands, producers in competing supply areas generally will be able to increase sales only by displacing the construction materials of competing suppliers.

Demands for imported wood construction materials for the home building industry in Japan will be affected by the average size of new housing units and by the amount of wood consumed per housing unit.

Average Size of Housing Units

The average floorspace per new housing start in Japan increased from 58.9 square meters (633.8 square feet) in 1965 to 84.1 (904.9 square feet) in 1977 (table 14). The average was somewhat higher for wooden housing than for nonwooden housing. In general, wooden housing consists of single family detached units, and nonwooden housing consists of high-rise apartments. The increase in average floorspace undoubtedly contributed to the rise in demand for imported construction materials during this period. We have assumed that the historical trend in increasing floorspace will continue into the future for both wooden and nonwooden housing. By 2000, the average floorspace for new housing would exceed 100 square meters (1,076 square feet) by our projections.

The volume of wood consumed per housing unit is influenced by the type of construction. The proportion of total housing starts made up of wooden housing decreased from 0.767 in 1965 to 0.641 in 1977 (table 15). The decline in this proportion was undoubtedly due to a combination of factors, including migration of the population from rural to urban areas, and an increase in land prices that inhibited construction of detached housing for a single family. Primarily because land prices are expected to continue to increase and because of increasing congestion in the metropolitan areas, we projected the number of wooden housing starts as a proportion of total starts to continue to decline in the future, reaching 0.55 in 2000.

Table 14--Average floorspace per new housing unit in Japan, by type of housing, for selected years, 1965-2000

(In square meters[1/])

Year	All housing units	Housing unit	
		Wooden	Nonwooden
1965	58.9	58.9	58.9
1966	62.9	63.2	62.0
1967	66.8	66.6	67.2
1968	65.9	66.4	64.5
1969	66.9	67.6	65.1
1970	68.1	68.5	66.9
1971	69.4	71.3	66.4
1972	71.2	73.1	68.3
1973	76.9	79.9	72.7
1974	81.5	84.8	75.0
1975	82.9	85.5	77.6
1976	82.2	85.5	76.0
1977	84.1	87.0	78.9
1980	87.0	90.0	82.0
1985	92.4	96.0	87.0
1990	96.7	101.0	91.0
1995	101.1	106.0	95.0
2000	104.8	110.0	99.0

Source: Office of Prime Minister (1978).

[1/] 1 square meter = 10.76 square feet.

Table 15--Number of housing starts in Japan, percent wooden housing, and percent nonwooden housing, for selected years, 1965-2000

Year	Housing starts (1,000)	Housing units	
		Wooden	Nonwooden
		- - -Percent- - -	
1965	843	76.7	23.3
1966	857	74.9	25.1
1967	991	76.5	23.5
1968	1,202	73.7	26.3
1969	1,347	71.3	28.7
1970	1,485	69.8	30.2
1971	1,464	66.1	33.9
1972	1,808	61.5	38.5
1973	1,905	58.8	41.2
1974	1,316	66.1	33.9
1975	1,356	66.9	33.1
1976	1,524	65.2	34.8
1977	1,508	64.1	35.9
1980	1,529	63.0	37.0
1985	1,610	60.0	40.0
1990	1,533	58.0	42.0
1995	1,476	56.0	44.0
2000	1,395	55.0	45.0

Source: Office of Prime Minister (1978).

Wood Consumed Per Housing Unit

We could find no detailed historical data for wood consumption by type of housing. A report by the Association of Southeast Asian Nations (1977) indicated that the number of cubic meters of sawn wood consumed per square meter of floorspace declined from 0.31 in the 1965-67 period to 0.21 in 1973. Other, fragmentary information obtained through the Forestry Agency of Japan also suggests that the volume of lumber consumed per unit of floorspace has declined for housing of all types (table 16), but not by as much as indicated in the Association report.

Table 16--Volume of lumber used per unit of floorspace in Japan, for selected years, 1965-75

(Cubic meters per square meter)

Year	Type of housing			
	Wooden	Ferro concrete	Steel frame	Ferro concrete and steel frame
1965	0.215	0.097	0.048	0.073
1970	.197	.091	.044	.068
1975	.192	.087	.042	.065

Source: Ueda, Michihiko. 1979. Japanese long-term housing outlook (1979-2000). 129 p., illus. State Wash. Dep. Nat. Resour. Olympia.

The volume of lumber consumed per unit of floorspace has probably decreased because of some substitution of metals, plywood, glass, etc., for lumber and because of increasing floorspace per unit of housing. For example, the area of walls does not increase as rapidly as does the floor area. Unless there is a major shift in construction techniques that we do not foresee, the volume of lumber consumed per unit of floorspace--the lumber usage rate--will probably not change much over the next two decades. If anything, the lumber usage rate will probably continue to decline gradually over time, reflecting our assumption that the average floorspace per housing unit will increase.

Lumber consumption and the demand for imported construction materials have been affected by four factors in the 1960's and 1970's: An increase in the number of housing starts, a decrease in the ratio of the number of wooden housing units to total housing starts, an increase in floorspace per housing unit, and a decline in the volume of lumber consumed per unit of floorspace. We expect the decrease in the proportion of wooden housing starts and the decrease in the lumber usage rate to continue. In addition, we expect average floorspace per housing unit to continue to increase. The only factor that deviates from past trends in our projections is the expectation of a relatively stable to declining number of housing starts.

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Housing demand in Japan is analyzed in terms of new household formations, vacancies, and replacements of housing stock. Total number of starts is projected to stay near current levels or decline, depending on assumptions about replacement demands. This contrasts with rapid growth in number of starts during the 1960's and early 1970's.

Keywords: Housing starts, trading policy (international), import/export (forest products), Japan.

The Forest Service of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives – as directed by Congress - to provide increasingly greater service to a growing Nation.