A PROJECTION OF MORTGAGE DEMAND

IN URBAN ALASKA: FISCAL YEAR 1982

by

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prepared for

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MEMORANDUM                                          April 17, 1981

TO:        Jay Kennedy, Alaska Housing Finance Corporation

FROM:      Lee Huskey, ISER

SUBJECT:   Reveiw of Fiscal Year 1982 Mortgage Demand Projection

    Demand for mortgage funds in FY 1981 has exceeded all previous projections. As a result of this unexpected level of demand, the projections which I made for mortgage demand appear conservative. This memorandum will briefly examine three areas where either assumptions made were conservative or new information leads to substantial changes.

    In some sense, this memorandum provides a sensitivity test for the model. In any model, the assumptions which lie behind the projections determine the level of the projections; changes in these assumptions result in changes in the projection. Given the ad hoc nature of the assumptions used in the mortgage demand model; the dated data base; and the major structural change brought by changes in AHFC programs, there is little guarantee of the accuracy of the projections. By examining the effects of changing some of the more important assumptions, we can examine the sensitivity of the model.

    The fiscal year 1982 projections may not be conservative, if the demand in FY 1981 reflects an aberration in the housing market. Housing market distortions may result from two factors: (1) pent up demand from past years which were a result of high mortgage rates and the lack of mortgage funds in 1979 and (2) the perception that mortgage funds are limited which resulted in a "land rush" mentality to get "cheap" mortgage funds while they last. In addition, changes in AHFC programs, such as the low income subsidy and PAM, have expanded the effective demand. These factors have greatly increased housing demand. This demand pressure has been placed against a supply of housing which has not expanded resulting in rapidly rising housing prices. The rise in housing prices also increases mortgage demand. These factors may result in a swelling of mortgage demand the first year of the programs which will subside as housing is constructed, reducing the pressure on price, and as adjustments to the new programs are worked out. The importance of these effects can only be judged by examining the 1981 mortgages.

    There are three areas where either new information or conservative assumptions make a reestimate of FY 82 mortgage demand necessary. These are: total housing demand, the savings constraint, and prices.

## Introduction

This paper presents a projection of the mortgage demand which will face the Alaska Finance Corporation in fiscal year 1982. Recent changes to the structure under which Alaska Housing Finance Corporation (AHFC) operates makes the projection of future demand a necessary planning step. This projection is to be used in conjunction with the informed opinions of AHFC officials and representatives of the state's housing and financial industries to decide on the probable level of mortgage demand in fiscal year 1982. In addition to providing information for the current decision making, this study is also the first step in developing a more refined methodology for projecting future mortgage demand.

Alaska Housing Finance Corporation was originally established to sell tax-exempt housing bonds and provide a secondary mortgage market for a portion of the housing market. Two major changes in the legislation have expanded AHFC's function to the provision of mortgage funds for the majority of the state housing markets. The first legislative change occurred at the national level; the U.S. Congress passed a bill which restricted AHFC's ability to use tax-exempt bonds to provide Alaska mortgage funds. In response to this change at the national level, the Alaska legislature provided a mechanism for the state to subsidize mortgage funds raised in regular bond markets. In addition, the state removed the income limits which had restricted the market served by AHFC.

The changes in legislation are the reason a projection of mortgage demand is required by AHFC. The legislative changes change the structure under which AHFC operates, primarily by broadening the market it serves. Because of this change, past experience is of little help in determining the future requirements of the program, and a projection of the demand becomes a necessary planning step. In addition, such a projection is a requirement in the budget process. AHFC can no longer simply go to the bond market to raise funds since it requires state funding for its subsidy.

This requirement means that AHFC must have an estimate of its future level of business when it approaches the legislature for funding.


## Alaska Urban Areas

A major distinction in the programs provided by AHFC is between programs for urban and rural housing. This projection in this study includes only the urban mortgage market. Rural Alaska has its own specific set of housing problems; these include the lack of an adequate secondary market and a history of inadequate housing. These problems require special considerations and programs. This study, as a first step in improving AHFC's projection capability, deals with the most straightforward aspects of AHFC's programs, the urban housing programs.

Although the rural areas have special problems, the urban areas are by far the largest part of AHFC's market. AHFC defines the urban area to include those areas which are road connected to Anchorage and Fairbanks and towns with greater than 4,500 population. For purposes of this study, we define the urban area to include the Anchorage, Fairbanks, Kenai, Seward, Valdez, Kodiak, Matanuska-Susitna, Southeast Fairbanks, Sitka, Ketchikan, and Juneau Census Divisions.

The urban areas contain the major portion of the state's population. In 1978, this area included eighty-two percent of the state's population. The population in this region expanded slightly faster than population in the state as a whole between 1970 and 1978. The share of state's population in this region increased from eighty percent in 1970 (Department of Commerce and Economic Development, 1979). This region will provide the majority of the demand for mortgage funds in fiscal year 1982.

## Mortgage Demand

The effective demand for purchasing housing determines the demand
for mortgage funds. The amount of mortgage funds depends only on the
number of units, their value, and the proportion of the total house price
which is loaned. We assume that AHFC handles all of the mortgages for
single family, duplex, and condominiums in urban Alaska. We also assume
that AHFC handles only one-half of existing mobile home sales and 75 per-
cent of new sales. Conversations with credit union officials indicate
that a large proportion of mobile home purchases are still made through
conventional consumer loans; this is primarily because of assessing
practices, quality limitations, and timing.

The loan-to-value ratio describes the proportion of housing price
which is loaned. We assumed that on average AHFC would loan 95 percent
of the value for all units, except duplexes. Because of the high cost
of duplexes, some of these may exceed the lending limits set by AHFC; we
assume that the loan-to-value limits will be 90 percent for existing
units and 80 percent for new units. These assumptions reflect only the
averages, and individuals may increase their down payment for many reasons.

Table 1 shows the mortgage demand by housing type. The projected
mortgage demand facing the state is $702.9 million. This is distributed
between all four types, with the major share (79 percent) going to single-
family units. Condominiums account for 6 percent, duplexes for 11 percent,
and mobile homes for 4 percent. The mortgage demand projected in this
report is a conditional projection. It is dependent on the set of assump-
tions described in the report.

Two aspects of the fiscal year 1982 mortgage demand need to be con-
sidered: exemptions under the Ullman Bill which allow the state to sell
some tax-exempt housing bonds and the effect of the AHFC's low-income
mortgage subsidy program. The Ullman Bill provides for the use of tax-
exempt bonds to finance certain housing; this bill allows up to $200 million

3

## TABLE 1. MORTGAGE DEMAND: ALASKA URBAN AREAS
## FISCAL YEAR 1982

| Type | Units | Value | Total Value (000,000) | Proportion Served by AHFC | Loan-to-Value Ratio | Mortgage Demand (000,000) |
|---|---|---|---|---|---|---|
| Single Family | | | | | | |
| Existing | 4,864 | $95,000 | $462.1 | 100% | 95% | $439.0 |
| New | 1,123 | 109,400 | 122.9 | 100% | 95% | 116.8 |
| Mobile Home | | | | | | |
| Existing | 955 | 26,500 | 25.3 | 50% | 95% | 12.0 |
| New | 670 | 30,500 | 20.4 | 75% | 95% | 14.5 |
| Condominiums | | | | | | |
| Existing | 253 | 75,000 | 19.0 | 100% | 95% | 18.1 |
| New | 308 | 86,400 | 26.6 | 100% | 95% | 25.3 |
| Duplex | | | | | | |
| Existing | 396 | 108,300 | 42.9 | 100% | 90% | 38.6 |
| New | 387 | 124,700 | 48.3 | 100% | 80% | 38.6 |
| | | | | | | $702.9 |

4

worth of mortgages on housing which has a value of less than 90 percent
of the average home sale value in the previous year. Single-family, con-
dominiums, and duplexes can be financed under this exemption. A rough
calculation based on the demand figures presented in this report indicates
that there is the approximately $200 million of mortgage demand in Alaska
urban areas which would meet the criteria. The average home price is
$95,000; 90 percent of this is approximately $86,000. If we take value
of sales below $87,000 (see Table 11 below), there is $192 million in
mortgage demand. There is $168.2 million in single family, 6.9 million
in duplex, and $16.9 million in condominiums. These results depend impor-
tantly on our assumptions. Given the conditional nature of our projections,
we can project that there will be $200 million in mortgage demand which
can be served with tax-exempt bonds.

The effect of AHFC's Special Mortgage Program with Home Ownership
Fund Assistance is to subsidize the cost of home ownership for lower-
income households. The subsidy reduces the interest on the loan to
6 percent or the payment to 25 percent of the household's income. The
income limits depend on family size and are approximately $29,000 for a
family of four. We can use our analysis to assess the qualitative effect
of this program on mortgage demand. The effect of this program is to
expand the value of a house which lower-income households can afford. The
maximum price of a home which a household with an income of $20,000 can
afford is increased from $44,000 to $66,000, while a household with
$30,000 income can purchase an $80,000 home instead of one costing $66,000.
Because of the limited supply of lower-priced housing, this program expands
the effective demand of housing by providing access to available housing.
One further consideration is that savings and down payment still provide an
effective constraint to participation in this program. Without the subsidy
program, given our assumptions, total demand for single-family housing less
than $66,000 would be 1,246. Comparing this with an available supply of
628 and the inability to build at this price indicates an excess demand of
618 households. The subsidy program reduces this excess by 410 households

by allowing these households to increase their purchases of higher-priced housing which is available.

The following sections of this report describe the methodology used in making these projections.


## The Determinants of Mortgage Demand

The major determinants of mortgage demand are the demand for housing and the household's housing choice decision. The housing choice decision includes the choice among types of housing--single-family, multifamily, duplex, or mobile home--and the choice of tenure--owning or renting. The mortgage demand facing AHFC will depend on the demand for owner-occupied housing. The choice of housing type will affect the total mortgage value.

Mortgage demand is influenced by the total demand for housing, not simply the demand for new housing units. In many cases, decision makers are concerned with projecting the demand for increased housing units, which is primarily a function of the growth in population. While the increase in housing is an important concern, especially to the construc-tion industry, we are interested in projecting the total demand for housing. Total demand includes not only the increased demand generated by increased population, but also housing demand generated by current residents who decide to move to new housing and in-migrants who replace population which moves out of the region.

Although the growth in total population and the demand for new housing receive the greatest attention, there are other equally important changes in the demographic structure of the population which affect the demand for housing. Even in a region with stable level of population, the population is not static. The age structure, family size, and sex distribution are examples of population characteristics which change over time. These changes

reflect the aging of the population, the natural forces of birth and death, and migration. Changes in these population characteristics affect what households consider as their best choice in housing and may lead to a change in housing units, generating a demand for housing.

The decision of a household to move from its present location has been studied a great deal by economists, geographers, sociologists, and others. These studies fit within the larger question of residential location. The mobility decision deals with two types of mobility: the decision to move to a different house within the region and the decision to move out of the region; each of these affects housing demand. The primary factors influencing the decision to move are life cycle changes. These include changes in family size and composition as well as employment changes such as increases in income or changing jobs. Changes in the wealth position of households, such as those resulting from increased equity in their current house, may also result in the decision to move.

Life cycle changes affect housing demand by changing what the household feels is its optimal housing choice. For example, as the number of people in the family increases, the family may decide its present house is too small and a bigger house would be optimal. A change in the optimal house may generate a move and add to the current demand for housing. When a household purchases a home, it also purchases a neighborhood; so changes in the neighborhood may also generate a desire to move. The importance of neighborhood and location may lead to another type of "movement," home improvement. If life cycle changes mean the house is not optimal but the neighborhood and location remain optimal, the household may change the house instead of moving. Major home improvement projects also lead to a demand for mortgage funds through refinancing.

The other type of mobility which is important to housing demand is the movement of new families into the region. The number of new migrants and the housing demand they generate may be greater than the net increase

in population since some migration occurs to replace people who have out-migrated or left the region. The decision to leave the region is also influenced by employment opportunities and life cycle considerations. The number of new residents entering a region will be determined by the expansion of the job opportunities in the region and the number of out-migrants. All of these new residents, not simply the net increase, will demand housing. Those households which choose owner-occupied housing will increase the demand for mortgage funds.

When estimating future mortgage demand, it is necessary to distinguish between potential demand (or housing needs) and effective demand. Potential demand is determined primarily by the demographic and life cycle factors we discussed above. The level of effective demand depends not only on this potential demand, but also on the growth of incomes, the income distribution, and the availability of mortgage funds. Effective demand distinguishes the effect of prices on housing desires; not every household which desires an owner-occupied house can afford one. Price provides an effective constraint, not simply because of the inverse relation between price and quantity demanded, but also because of the link between income and price forged by lending institution eligibility rules.

Housing supply and its distribution among various price levels may also limit effective demand. The response of the housing supply industry determines the extent to which increased potential demand becomes effective demand. If no new construction occurred in response to increased demand, the effect would be simply to increase the price of housing. The extent that supply increases in response to demand increases will determine the extent that price increases. The supply response needs to be measured in terms of its type and price distribution. Both the price and quantity response will influence effective demand.

8

HOUSING DEMAND IN FY 1982

This section describes a projection of housing demand for FY 1982 and the model which was used to produce the projection. The model used reduces the complexity of housing choice decision making by projecting three separate steps of the process. The model projects in three steps: (1) the decision to move, (2) the housing choice decision (potential demand), and (3) the effective demand for housing. The model can only be considered a preliminary effort in the development of a mortgage demand forecasting model. This effort, in addition to producing a preliminary forecast, will also provide a description of areas where increased effort would improve AHFC's ability to forecast future mortgage demand.

The projections presented in this section are dependent on the set of assumptions and assumed relationships which make up the model. Models provide a way of reducing our uncertainty, but they cannot be expected to eliminate the uncertainty. Models simply provide a way to reduce the uncertainty by specifying those areas about which we make assumptions. Because of this, we know that the projections produced with this model are contingent on the set of assumptions incorporated in the model.

The model and projection are demand oriented. The demand orientation is expressed by the assumption that increases in the demand for housing are the primary determinants of the effective demand. Supply enters only when considering the price of housing and its constraining effect on demand. The quantity of new housing produced is assumed to equal the level of effective demand for new housing. This may not be the most appropriate assumption and, in fact, may overestimate mortgage demand in periods of rapid growth.

The other basic consideration of the model is that it is a life cycle-based model. Potential demand is a function of the number of households in various life cycle stages. The concentration on life cycle as the prime determinant of housing demand is consistent with most other work on household mobility and housing choice.

9

A final general consideration concerns the calibration of the model. Models depend on information and data about the system they describe. This information provides both the starting point for the projection and the parameter value assumptions which quantify the assumed relationship which defines the model. The perfect set of information would include up-to-date and regionally specific information on the socioeconomic and life cycle characteristics of the base population, the housing preferences of individuals by life cycle stages, the determinants of these preferences, and the characteristics of the region's housing supply. As in most modeling exercises, we did not have access to this perfect set of information; the information used in this study came primarily from an existing 1976 survey of the Alaska population conducted by the Census Bureau (Survey of Income and Education [SIE]) and two national publications which described movers (Housing Characteristics of Recent Movers and Geographical Mobility, both published by the Bureau of the Census).

The next three sections of the report describe the three separate components of the model. In each section, a general description of the model is given; the specific assumptions used are described; the results are presented; and the caveats which should be considered when using these results are introduced.

Decision to Move. This submodel estimates the number of households who will be in the market for housing. There are four groups of households: those moving to different housing within the region, those making major improvements to their existing housing, new households, and in-migrating households. We assume the first two can be estimated as one group, the movers; and the second two as another group, new households. The size of each group is a function of the head of household age distribution of the population; changes in age reflect life cycle changes for the households. The number of new households will also be determined by the increase in employment opportunities since in-migrants are needed to fill these new jobs.

10

To estimate the size of each group, we need the following information:

- The base year household distribution by age; 1980 is the base year.
- The rates at which households in different age cohorts move within the region and outside the region.
- The increase in employment opportunities over the base year level.
- The household employment rate, which allows us to estimate the number of households a given employment increase generates.

The assumptions and steps followed in estimating the size of each group are described below.

1. <u>Base Population</u>. The 1980 Census will provide a description of the households in urban Alaska. Unfortunately, this information was not available at this time. The household distribution in 1980 was estimated from a projection of the 1980 employment. Employment was used instead of population because there is still disagreement over the population levels in 1980.

The change in statewide employment by industry projected between 1979 and 1980 in <u>The Alaska Economic Information and Reporting System Quarterly Report</u> (Office of the Governor, November 1980) was allocated to the urban and non-urban regions of Alaska based on historical trends (see Table A-1). The number of households related to this level of employment were forecast in two steps. First, an occupation distribution was forecast using the occupation-industry matrix developed by the State Labor Department (see Table A-2). The number of employees who are household heads was estimated based on the distribution found for non-Natives in the 1976 Alaska Survey of Income and Education. The survey did not distinguish respondents by place within Alaska, so non-Natives were used to represent urban Alaska.

These rates were adjusted so that they were consistent with household estimates made for urban Alaska (see Goldsmith and Huskey, 1980) (see Table A-3).

Once the number of households by occupation of household head were estimated for the base year, the households were placed in life cycle groups. Each life cycle group consists of households with the same age of household head, household size, and residency in Alaska. We assumed this distribution by occupation would be the same as that found in the 1976 SIE. The distribution was applied to the projected households by occupation. The base year (1980) household distribution is shown in Table 2.

2. Movers. The movers submodel simulates the complex demographic changes which result in a household's decision to move to a different house within the region. Changes in the age of the household head are assumed to represent the important demographic changes. The decision to move is represented by a set of household mover rates for each age group, which represents the probability that a household will change houses within one year. These rates are shown in Table A-4. These rates were based on national mover rates found in Geographical Mobility: March 1975 to March 1979 (Table 9, p. 22). These rates were applied to the existing population by age of household head distribution to determine the number of movers. Movers were assumed to have the same distribution across life cycle groups as found in the population in each age group.

3. New Households. In this preliminary model, the aging and creation of new households was not explicitly treated. The short time period over which the projection was made was the primary reason for this. The new households formed from the existing population were assumed to follow housing demand patterns similar to in-migrant households. The total number of new households was assumed to equal the in-migrant households.

TABLE 2.  1980 DEMOGRAPHIC STRUCTURE OF HOUSEHOLDS RESIDENCY

| | < 2 Years | | | 3 - 5 Years | | | 6 + Years | | |
|---|---|---|---|---|---|---|---|---|---|
| | Household Size | | | Household Size | | | Household Size | | |
| Age of Household | 1 - 2 | 3 - 5 | 6 + | 1 - 2 | 3 - 5 | 6 + | 1 - 2 | 3 - 5 | 6 + |
| < 25 | 1,430 | 1,958 | 168 | 735 | 841 | 99 | 2,798 | 1,907 | 68 |
| 25 - 50 | 2,878 | 8,956 | 2,675 | 2,812 | 5,424 | 4,356 | 8,629 | 22,813 | 11,217 |
| 50 < | 1,000 | 625 | 292 | 524 | 1,217 | 200 | 10,499 | 5,334 | 2,742 |

1.  Based on demographic rates by occupation of household head found in 1976 Survey of Income
    and Education.

13

There are two major determinants of the number of new (in-migrant) households: the number of households leaving the region (out-migrants) and the number of new employment opportunities created. The number of out-migrating households was determined in a manner similar to that used to determine the number of movers. Out-migration rates for each age group are assumed to describe the complex set of changes which determine the decision to leave the region. These rates are also taken from Geographical Mobility and reflect national rates. The rates are shown in Table A-4. Applying these rates to the population determines the number of households leaving the region. Out-migrant households were assumed to be distributed among occupations as in the base population.

Growth in the employment opportunities also leads to the creation of new households. The projected growth of employment opportunities in the region in 1981 and 1982 was found as in the base year (see Table A-1). Growth in the region reflects a moderate rate of growth, with none of the large construction projects frequently discussed (ALPETCO, Northwest Gasline, PacAlaska LNG, etc.) assumed to get beyond the site preparation stage prior to 1983. Increased employment opportunities are translated into number of households using the industry-occupation matrix and household head-by-occupation distribution described above.

The total new households equal both the number required to replace out-migrants and the number required to fill new jobs. These new households were distributed to life cycle groups by assuming these households could be described by the occupational distribution for households with less than two years residency found in the 1976 SIE. This distribution was applied to the new households to estimate the number of households in each life cycle group.

14

The steps and assumptions described above provide an estimate of the number of households demanding housing in 1981 and 1982; the average of these years is assumed to describe the fiscal year 1982 demand. Table 3 describes the number of households in each important group. Of the 102,197 households in the region in 1980, an average of 9,229 move within the region and 11,717 leave the region in 1981 and 1982. For fiscal year 1982, there are a total of 25,203 households which will demand new housing. These numbers show that, according to our assumptions, the movement of population independent of its net increase is a much greater influence on housing demand, accounting for 83 percent of the total demand in this period.

The results of this step depend on the accuracy of the assumptions used. The primary problem with the model may be its simplicity. Increased completeness of description would result from disaggregating each mover group, introducing the aging of the population, and expanding the determinants of the decision to move.

The primary reason the model is simple is the lack of data about the household decision-making process, which is the main limitation to the use of these projections. The primary source of Alaska data was the 1976 SIE; this data may reflect the rapid growth in the economy which occurred between 1974 and 1976. Our only means of correcting for problems resulting from this was to adjust the distributions by occupation and length of residency. The other problem with the data is the use of national parameters to describe the movement rates. This assumes the only influence on movement is age of head, and controlling for this provides an accurate regional description. This is probably not an accurate assumption, but because of the lack of local information, it is the only approach available. Many of these data problems will be eliminated with the 1980 census when similar information for Alaska becomes available.

TABLE 3.  OUT-MIGRANTS, MOVERS, AND IN-MIGRANTS


<u>1980-81</u>


| <u>Age of Household Head</u> | <u>Out-migrants</u> | <u>Movers</u> | <u>In-migrants</u> |
|---|---|---|---|
| < 25 | 1,631 | 1,088 | 2,361 |
| 25 - 50 | 9,139 | 7,275 | 12,135 |
| 50 < | 673 | 652 | 1,889 |


<u>1981-82</u>


| <u>Age of Household Head</u> | <u>Out-migrants</u> | <u>Movers</u> | <u>In-migrants</u> |
|---|---|---|---|
| < 25 | 1,750 | 1,168 | 2,125 |
| 25 - 50 | 9,531 | 7,587 | 11,512 |
| 50 < | 709 | 688 | 1,926 |

16

Housing Choice. This submodel estimates the type of housing desired by the households projected to move to new housing. There are five types of housing: single family, mobile home, duplex, multifamily, and condo. Of these, only condo and multifamily distinguish an owner as well as a structure type. We assume that one-half of those desiring duplexes wish to own them and half wish to rent. For single-family and mobile homes, we appeal to historical distributions to differentiate owner and renter occupancy. Housing choice, like the decision to move, is assumed to be a function of the household's life cycle stage.

To estimate the number of households desiring each type of housing, we need two pieces of information. First, we need to know the number of households in each life cycle group. This distribution of housing demands is an output of the Decision to Move Submodel. Second, we need information on how the housing choice is affected by life cycle characteristics.

Defining parameters which describe the relationship between life cycle and housing choice is the most important part of this submodel. Regression analysis of the survey information provided in the 1976 SIE was used to estimate these parameters. A linear probability model was estimated for each of five housing types. These regressions can be used to estimate the probability that a person with given life cycle character- istics would choose a particular type of housing. Each household in the survey provided an observation which related their housing choice and life cycle characteristics.

This method provides not only a method for projecting the housing choice but also a test to the hypothesis that housing choice is influenced by life cycle characteristics. Three life cycle characteristics were chosen to explain housing choice: age of head, household size, and residency. This choice was influenced by theory and the nature of our data. Family size and incomes have often been isolated as the major determinants of housing choice. Age of head was included primarily as a

17

proxy for income and also wealth. Income was not included directly for three reasons. First, the only measure of income was current income, which may not represent permanent income (or the household's assumptions about its long-run income potential) which may be the true determinant of housing choice. Secondly, the income would have been in 1976 dollars and would reflect the relationship between income and housing prices in that year; this would not be easy to project into the future. Finally, and most importantly, the observations from the SIE were of current owners; there was no way to distinguish recent purchasers. Because of this, there is no reason to believe the relationship between an owner's current income and the household's current income represents the relation at the time the unit was occupied. The length of residency was included because of our hypothesis that recent movers are less likely to purchase housing. Reasons for this include the high cost of the move's exhausting assets and the short-term nature of new residents' potential residency.

Table 4 shows the parameters from these regressions. Although the goodness of fit varies between the various housing types (measured by $R^2$; and $R^2 = 1$ measures a perfect fit), certain reasonable hypotheses about the importance of life cycle and housing choice are supported. Examining the single-family and multifamily equations shows that age, residency, and family size have alternate effects. Older, bigger, longer resident households tend to choose single-family more and multi-family less. This seems a reasonable result.

These equations are used to project the number of households desiring each housing type. The housing choice estimates are achieved by using these equations to estimate the probability that households in each life cycle group will choose a type of housing. These probabilities are multiplied by the number of households in each life cycle group projected above (see Table A-5). Table 5 shows that the projected distribution for 1980 housing is similar to that found in 1978, which may provide some support to our results.

18

TABLE 4.  HOUSING CHOICE EQUATIONS

| Age | Single Family | | Mobile Home | | Duplex | | Condominium | | Multifamily | |
|---|---|---|---|---|---|---|---|---|---|---|
| < 25 | −.185 | (20.9)* | .012 | (.2) | .015 | (.4) | −.022 | (2.4) | .183 | (26.5)* |
| 25–50 | −− | | −− | | −− | | −− | | −− | |
| 50 < | .128 | (17.2)* | −.030 | (2.3) | −.015 | (.6) | .017 | (2.3) | −.101 | (13.9)* |
| **Household Size** | | | | | | | | | | |
| 1 − 2 | −.059 | (4.4)* | .009 | (.3) | .023 | (1.9) | .006 | (.3) | .017 | (.5) |
| 3 − 5 | −− | | −− | | −− | | −− | | −− | |
| 6 + | .106 | (12.4)* | −.030 | (2.4) | −.038 | (4.5)* | −.011 | (1.0) | −.027 | (1.0) |
| **Residency** | | | | | | | | | | |
| 1 − 2 | −.144 | (13.7)* | −.044 | (3.1) | −.004 | (.0) | −.002 | (.0) | .192 | (31.5)* |
| 3 − 5 | −− | | −− | | −− | | −− | | −− | |
| 6 + | .185 | (30.6)* | −.034 | (2.5) | −.019 | (.9) | .009 | (.6) | −.142 | (23.2)* |
| Constant | .418 | | .139 | | .101 | | .023 | | .319 | |
| $\bar{R}^2$ | 13.6 | | 0.2 | | 0.4 | | 0.4 | | 14.6 | |

*F statistic in parentheses; significant at greater than 95 percent.

SOURCE:  1976 Survey of Income and Education

TABLE 5.  PROJECTED HOUSING STOCK DISTRIBUTION

|  | 1980 | 1978 |
|---|---|---|
| Single Family | .525 | .514 |
| Mobile Home | .100 | .131 |
| Duplex | .085 | .086 |
| Condominium | .029 } .290 | .270 |
| Multifamily | .261 | |

Table 6 shows the distribution of housing choice among the five types of housing.  The major choice is multifamily housing, which accounts for 45 percent of the desires of housing demanders.  Single-family housing accounts for 34 percent of the desires.  This high proportion of multi-family demand can be explained not only by the relative youth of demanders but also because of the effect of length of residency, since over 63 percent of the demand is by households new to the region.

The major limitations on the results of this submodel concern, as in the movers submodel, model structure and data.  The primary concern with model structure concerns a fuller description of the housing choice decision.  In this model, we concentrated primarily on type of structure. A further component of the choice is tenure (owner/renter); expanding the analysis to include this decision would improve the results.  The major data problem has been previously isolated; the housing choice decision we are observing does not just include recent movers.  A better data set would include just recent movers.  One way we attempt to correct for this is by including residency as an explanatory variable.

Effective Housing Demand.  Not everyone who wishes to purchase housing will be able to do so.  The effective demand for housing is a function not only of the desire to own various types of housing, but it also depends on the ability of these households to purchase housing. This submodel estimates the number of households that are able to pur-chase housing.  This step starts with desires of households to move into various types of housing; in this step, we deal only with those housing types--single family, mobile homes, duplex, condominiums--which have a major proportion of owner occupants.  The number of households actually able to purchase housing depends on the nexus of the price of housing they desire, their incomes, and wealth.  To assess the constraint on desires to ownership, we must know about the supply conditions of housing as well as the demand aspects.

TABLE 6.   PROJECTED HOUSING DEMAND:
ALASKA URBAN AREAS

|  | 1981 | 1982 | FY 1982[1] |
|---|---|---|---|
| Single Family | 8,729 | 8,469 | 8,599 |
| Mobile Home | 2,433 | 2,378 | 2,406 |
| Duplex | 2,397 | 2,365 | 2,381 |
| Condominium | 560 | 546 | 553 |
| Multifamily | 11,281 | 11,249 | 11,265 |

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[1]Growth in FY 1982 is assumed to equal the average of the growth in 1981 and 1982.

To estimate the level of effective demand, we need to know the following information:

- The income and wealth position of households by the type of housing they desire.
- The distribution of prices found in the existing stock of housing and the supply response, both price and quantity, of new housing to the existence of excess demand.
- Financial institution rules which translate the income and wealth of households into ability to purchase housing.

The assumptions and steps followed in estimating the level of effective demand are described below.

1. <u>Housing Demand by Housing Value</u>. Housing is not one singular product; housing differs in many important ways, including size, location, and style. One of the important dimensions which differentiates housing, and in fact reflects differences in other dimensions, is price. This step allocates the potential demand estimated above by the price of house which can be afforded. Basic to this is a definition of the income and wealth position of the population.

The income and wealth distributions used in this step were based on those found in the 1976 SIE. The income distribution by age was found in two steps. First, the income distribution by age was found from the SIE for each occupation. These distributions were multiplied by the projected occupational employment and summed across occupations to produce an income distribution for each age group (see Table A-6); this accounts for changes in the occupation structure and its effect on income distribution. This assumes income is a function of the occupation of employment and the job experience represented by age.

The wealth position of households is represented by the savings distribution found in the SIE. This underestimates the wealth positions of individuals to the extent that wealth is held in other assets, but this consideration of wealth is primarily to emphasize its importance as a constraint. The savings distribution is found by age and income, which assumes the time a household has had to save and the amount it earns are the primary determinants of savings. The savings distribution shown in Table A-7 seems to support our working hypotheses that savings increase with age and income. Both income and savings distributions are adjusted from their 1976 levels based on projections found in the 1980 AEIRS projection; they are both assumed to increase at the projected rate of growth in per capita personal income between 1976 and 1981 (1.36 percent), although the distributions are assumed to remain the same.

Table 7 illustrates how a household's income and wealth position constrains its demand for housing. The constraint comes in the form of financial lending rules which define a relationship between income, wealth, and the maximum value of housing that a household can afford. The general lending rule we assumed defines the maximum house price that a household can borrow by:

    (a)   limiting the household's monthly payment to twenty-five percent of its income;

    (b)   assuming the loan amount is one hundred times this monthly payment; and

    (c)   requiring a down payment of five percent.

Given this lending rule, the maximum house price which any household can pay is determined by its income. The proportion of households in each income group which can purchase a house at this maximum price is determined by their savings which must equal five percent of this price.

24

TABLE 7. PROPORTION OF HOUSEHOLDS BY AGE AND INCOME
ABLE TO AFFORD MAXIMUM HOUSE VALUE

| Income | Maximum House Price[1] | Age | | | | | |
|---|---|---|---|---|---|---|---|
| | | < 25 | | 25 - 50 | | 50 < | |
| | | Maximum | Minimum[3] | Maximum | Minimum | Maximum | Minimum |
| < $20,000 | $ 66,000[2] | 24.4% | | 43.0% | | 77.5% | |
| $20-30,000 | $ 80,000[2] | 45.0 | 63.0% | 54.0 | 62.1% | 74.4 | 78.8% |
| $30-40,000 | $ 87,000 | 20.0 | 26.0 | 68.6 | 76.0 | 80.1 | 85.9 |
| $40-50,000 | $109,500 | 33.3 | 33.3 | 73.8 | 77.5 | 85.4 | 89.1 |
| $50-70,000 | $154,000 | 100.0 | 100.0 | 80.0 | 81.5 | 82.0 | 87.2 |
| $70-100,000 | $219,000 | - | - | 100.0 | - | 100.0 | - |
| $100,000 < | - | - | - | 100.0 | - | 100.0 | - |

[1] Based on assumed lending rule which restricts loan value to equal one hundred times 25 percent of household monthly income. Loan value is assumed equal to 95 percent of house value.

[2] AHFC mortgage subsidy program allows maximum house value to expand by approximately one-third.

[3] Minimum is maximum amount of previous group.

The special AHFC low income housing subsidy program eases
the effect of the lending rule on low income households.  In
this program, AHFC subsidizes the interest payment of low income
households.  This has the effect of expanding the housing price
low income households can purchase by approximately one-third.
The down payment or wealth constraint is still effective for
these households.

Potential housing demand by income and age is shown in
Table 8.  This distribution was found using the distribution
of housing type by income and age found in the SIE and age-
specific housing choice projections found with the housing choice
equations.  Housing choice by income for each age group was
adjusted to equal the age-specific housing choice projections.

2.  Housing Supply.  The ability to purchase the housing
desired will also be constrained by the supply of housing.
The effective demand for mortgage funds will be limited by the
number of houses available for sale.  For example, if there are
ten households which can buy $100,000 houses, but there are only
five of these houses available, the effective mortgage demand
will be $500,000.  Supply can be described in terms of its price
and quantity.  There are two dimensions of supply, existing stock
and new production.

The available existing stock of housing for sale is that
which is vacated by movers and out-migrants.  The quantity and
type of housing made available in this manner was estimated based
on two pieces of information.  First, the proportion of movers
moving from owner-occupied dwellings was estimated using national
information on recent movers (see Table A-8).  The proportion of
movers moving from owner-occupied units by age of household head
was applied to the total number of movers and out-migrants by age

TABLE 8. HOUSING DEMAND BY HOUSEHOLD INCOME AND AGE

| Age of Household Head | Income | | | | | | |
|---|---|---|---|---|---|---|---|
| | < $20,000 | $20-30,000 | $30-40,000 | $40-50,000 | $50-70,000 | $70-100,000 | $100,000 < |
| **< 25 Years** | | | | | | | |
| Housing Type | | | | | | | |
| Single Family | 77 | 54 | 112 | 62 | 79 | 14 | – |
| Mobile Home | 169 | 76 | 79 | 48 | 21 | – | – |
| Duplex | 114 | 75 | 146 | 45 | 19 | – | – |
| Condominium | 8 | 3 | – | – | – | – | – |
| **25-50 Years** | | | | | | | |
| Housing Type | | | | | | | |
| Single Family | 860 | 644 | 1,430 | 1,344 | 1,813 | 750 | 187 |
| Mobile Home | 389 | 245 | 460 | 235 | 409 | 79 | 17 |
| Duplex | 381 | 252 | 502 | 148 | 270 | 182 | 21 |
| Condominium | 91 | 47 | 66 | 76 | 100 | 55 | – |
| **50 Years <** | | | | | | | |
| Housing Type | | | | | | | |
| Single Family | 103 | 112 | 205 | 190 | 143 | 162 | 59 |
| Mobile Home | 30 | 20 | 42 | 41 | 41 | 6 | – |
| Duplex | 65 | 34 | 48 | 27 | 51 | – | – |
| Condominium | 14 | 10 | 21 | 9 | 36 | 17 | 1 |

SOURCE: Based on distribution of housing type by age by income from 1976 SIE and the age-specific housing choice projection.

27

to estimate the number of owner-occupied units made available.
The second step involved allocating these units among types.
The distribution of types by age of household head was based
on the 1976 SIE distribution.  The existing supply of housing
by type estimated with this procedure is shown in Table 9.

Very little information is available on the price dimension
of supply.  Our assumed price distribution is based on information
on Anchorage sales and AHFC loans.  The average price of existing
units was assumed to be reflected by AHFC loans in 1980.  During
this period, AHFC financed approximately all of the housing
market, so their loans are assumed to be representative of the
market.  Table 10 shows the assumed average price of each type.
These were based on an assumed loan-to-value ratio of 95 percent
for single family, condominiums, and mobile homes and 90 percent
for duplexes.  Average house prices were assumed to increase at
the projected rate of increase in the housing component of the
Consumer Price Index (CPI) (AEIRS, 1980).  (The rate of increase
projected between 1980 and FY 1982 was 1.105.)

The distribution of housing prices around these averages is
also important since the relation between this distribution and
the housing demand by income distribution determines effective
demand.  Our assumed price distribution is based on an analysis
of single-family sales in Anchorage (information on sales dis-
tribution was provided by Anchorage Multilisting Service).
Sales data from 1979 and 1980 were examined, and a cumulative
distribution of proportion of housing supply by proportion of
average price was developed (see Table A-9).  The distribution
was almost identical in 1979 and 1980.  This single-family-
Anchorage distribution was used to allocate the existing supply
of all types of housing by price.  The lack of available infor-
mation on the supply characteristics of other types and other
areas made this extreme assumption necessary.

TABLE 9.  EXISTING SUPPLY OF OWNER-OCCUPIED
HOUSING BY AGE

| | Age | | | |
|---|---|---|---|---|
| Housing Type | < 25 | 25 - 50 | 50 < | Total |
| Single Family | 110 | 4,166 | 588 | 4,864 |
| Mobile Home | 59 | 828 | 68 | 955 |
| Duplex | 3 | 205 | 44 | 252 |
| Condominium | 53 | 669 | 67 | 789 |

TABLE 10.  AVERAGE VALUE OF HOUSING
ALASKA URBAN AREAS

| Type | Existing[1] | New[2] | |
|---|---|---|---|
| Single Family | $95,000 | $109,400 | (93,000)[3] |
| Mobile Home | 26,500 | 30,500 | (25,900) |
| Duplex | 108,300 | 124,700 | (106,000) |
| Condominium | 75,000 | 86,400 | (73,000) |

[1]Based on AHFC loans for 1980.  Assumes 95 percent financing for single-family, mobile home, condominiums, and 90 percent for duplexes. Price assumed to increase at projected increase in housing component of the CPI (Office of the Governor, 1980).

[2]Average price of new housing based on comparison of Anchorage average with estimate of average price of new construction.  This rate applied to urban area prices and to all types.

[3]Minimum price of new construction in parentheses, based on estimate of Anchorage minimum for single-family units.

New housing is the other dimension of housing supply. Our description of the response of new housing to increased demand is not very well developed. There are two dimensions to this description, the average price and minimum price of new units. These dimensions are based solely on informed opinions of area realtors. Based on this source, we developed an average and minimum price for new single-family construction in Anchorage. The relation between the urban Alaska single-family price and Anchorage average was used to extend our information on new Anchorage housing to urban Alaska and to other types of housing. New houses were assumed to be built to meet the excess demand above the minimum price for each type of unit. Although this greatly simplifies the dynamics of housing supply, it is appropriate for our demand-oriented model.

3. Effective Demand. Table 11 compares the existing supply, constrained demand, and excess demand by housing price for single-family, condominiums, and duplexes. The level of constrained demand reflects the effect of income and savings on housing desires. The level of constrained demand is determined by the rates from Table 7 to the housing desires shown in Table 8. It equals the total number of households which desire each type of housing and can afford no more than the price described.

This table reflects two additional assumptions about demand. First, it is assumed that the large mobile home demand estimated by the housing choice equations is primarily a result of the peculiar supply conditions in 1976. We assume one-fourth of this demand is allocated equally to the other three types. Secondly, we assume that ten percent of the single-family and mobile home demand projected by the housing choice equations is for rentals and demand is reduced by this amount. This assumption is based

30

TABLE 11.  CONSTRAINED DEMAND BY HOUSING TYPE[1]
FISCAL 1982

| Value | Single Family | | | Condominium | | | Duplex[2] | | |
| | Existing Supply | Constrained Demand | Net Demand | Existing Supply | Constrained Demand | Net Demand | Existing Supply | Constrained Demand | Net Demand |
|---|---|---|---|---|---|---|---|---|---|
| <$44,000 | 170 | 167 | -3 | 21 | 19 | -2 | 10 | 94 | 84 |
| 66,000 | 458 | 659 | 201 | 69 | 89 | 20 | 24 | 327 | 303 |
| 80,000 | 584 | 458 | -126 | 44 | 52 | 8 | 26 | 229 | 203 |
| 87,000 | 818 | 1,128 | 310 | 62 | 89 | 17 | 37 | 454 | 417 |
| 110,000 | 1,694 | 1,088 | -606 | 38 | 91 | 53 | 118 | 166 | 48 |
| 154,000 | 984 | 1,542 | 558 | | | | 151 | 300 | 149 |
| 219,000 | 122 | 853 | 731 | 19 | 249 | 230 | 30 | 220 | 190 |
| 219,000 < | 34 | 227 | 193 | | | | | | |

---

[1]Assumes one-fourth projected mobile home demand is demand for other units.  This demand (600 units) is evenly distributed among these types.

[2]Duplex supply is structures; each contains two units.  Constrained demand is for units.  Net demand includes both renters and purchasers.

on limited evidence from Anchorage where the rental proportion
approaches 15 percent (Population Profile, 1978). We assume that
everyone who demands a mobile home can afford one, so mobile homes
are not included in this table.

The construction of new housing is derived from this table.
It is assumed to equal the excess demand above the minimum price
for which new housing can be built. We assume that excess supply
at lower prices is used to absorb excess demand prior to the con-
struction of new units.

The demand for each type of housing is shown to be effectively con-
strained by the relation between income, wealth, and the supply of housing.
Both the quantity and price dimensions of supply are important for this
effect. Of primary importance is the assumption that not all types of
housing can be produced; that there is a minimum price at which housing
can be produced. Table 12 summarizes the effects of these constraints by
comparing the housing desires with constrained and effective demand. The
effective demand is 76 percent of the housing choice for single family
and 75 percent for condominiums. Only 61 percent of those wishing to
live in duplexes are able to (two times the effective demand).

Information and model limitations in this submodel are most important.
Many of our results concerning effective demand depend on an assumed struc-
ture of supply. As we have mentioned, our knowledge of the supply side is
extremely limited, and a different assumed distribution and response would
produce different results. If the supply of lower-priced housing is greater
than we assumed, the effective demand will be greater. If the supply response
of new housing differs, both in quantity and price response, the effective
demand will differ.

The demand side also suggests caution for two reasons. First, the
data used is old (1976) and may provide a faulty description of the income

TABLE 12.  HOUSEHOLD EFFECTIVE DEMAND
FISCAL YEAR 1982

| Type | Housing[2] Choice | Constrained Demand | Existing Supply | New Construction | Effective[4] Demand |
|---|---|---|---|---|---|
| Single Family | 7,919 | 6,122 | 4,864 | 1,123 | 5,987 |
| Condominium | 753 | 589 | 253 | 308 | 561 |
| Duplex[1] | 2,581 | 1,790 | 396 | 387[3] | 783 |
| Mobile Home | 1,625 | 1,625 | 955 | 670 | 1,625 |

---

[1] Housing Choice and constrained demand are in units.  Existing supply and new construction are in structures (assume one rental-one owner unit per structure).

[2] Adjustments made to those in Table 5 are based on the assumptions that one-fourth of mobile home demand is demand for other types of housing, and ten percent of single-family and mobile home demand is for rentals.

[3] New duplex construction assumes that all those who cannot afford to buy duplexes rent.  New construction equals the total who can afford to buy new structures as long as that does not exceed one-half total unmet demand.

[4] Effective demand equals existing supply plus new construction.

and savings structure of the population.  These distributions may also
be influenced by, as well as influence, the choice of housing.  For
example, recent home buyers may have only limited savings because of
their purchase.  Secondly, the description of housing demand may represent
specific supply constraints of the particular year the survey was taken.
This may influence both the type chosen and the owner-renter distribution.


## Conclusions


This report has projected a demand for mortgage funds of approximately
$700 million facing AHFC in fiscal year 1982.  The projection is contingent
on the accuracy of the parameters and relationships used.  In most cases,
the assumptions made and methodologies used in this study present the best
possible given the limited data available on housing demand and supply.
Because of the contingent nature of the projection, this projection must
be considered with other types of analysis when estimating the mortgage
demand.


Although the results provided in this analysis are limited by the
available data, the model exercise should be considered a useful exercise.
This model can only be considered a preliminary effort.  The evaluation
of the model described in this paper will allow AHFC to decide on the
future usefulness of such a model for their decision making.  The model
also helps to define a research agenda, if a future model is chosen.
This paper has emphasized important data needs and model improvements
which would allow a better projection of mortgage demand.


There are several areas where additional research could improve the
model and its resultant projections.  These areas are briefly described
below:

- Improved description of the baseline population. The 1980 census
  will provide updated information on population and housing. This
  information should be incorporated when it is available.

- Description of movers and out-migrants. A better description of
  these groups and the determinants of their movement is needed.
  The 1980 census will provide some information of the type used
  in this study for Alaska-specific populations. Further informa-
  tion on the cause of movement would have to come through surveys
  of recent or potential movers.

- Housing choice of movers and in-migrants. The current model uses
  the housing choice of all households given their current life cycle
  stage; an improvement would be to have this information for house-
  holds at the time the choice is made. This would allow us to
  include the effect of income and wealth on choice. This informa-
  tion, at least for purchasers, may come from AHFC files. A better
  source of information would include surveying recent movers.

- Existing supply. A better understanding of movers and out-migrants
  would include a description of the housing they leave. This would
  allow an improved description of the existing supply.

- Housing supply response. The response of housing supply needs
  to be better understood since it is an important constraint to
  effective demand. This response must be understood in terms of
  the price and quantity response of new and existing housing.
  The quantity response of existing housing relates to the effects
  of increased wealth on the movement of home owners. Such an
  understanding could be developed using sales and building permit
  data. A historical series could be developed which could be
  explained by various demand factors.

In addition to their usefulness for projection of future levels of
demand, models are useful in the analysis of policy questions. The develop-
ment of a more detailed housing market model would allow AHFC to address
questions of policy. The model could be used to examine the effects of
alternate policies on mortgage demand or other important policy variables.

Even the crude model developed in this paper points out some ques-
tions of policy importance. The model's isolation of the determinants
of effective demand outline important considerations for future policy.
Effective demand is a function of the income and wealth position of the
population and the price distribution of the housing stock. Programs
which are intended to expand the opportunity to own housing must not
concentrate only on the income constraint. The lack of savings for the
initial down payment may be a more effective constraint, and this will
affect more than low-income households. Effective demand is also limited
by the availability of housing which households can afford. Because of
this, the supply response of housing to increases in demand may deter-
mine the impact of AHFC programs on effective demand. This response
includes three dimensions: new housing construction (its quantity and
price), the effect on the price of existing stock, and the effect of
price increases on the decision to move and the expansion of supply at
lower prices.

# References

Alaska, Division of Economic Enterprise. Numbers. 1979.

Alaska, Office of the Governor. The Alaska Economic Information and Reporting System, Quarterly Report. November 1980.

Anchorage Municipality. Population Profile. 1978.

Anchorage Real Estate Research Committee. Anchorage Real Estate Research Report. Fall 1980.

Goldsmith, S., and L. Huskey. Electric Power Consumption for the Railbelt: A Projection of Requirements. 1980.

U.S. Department of Commerce, Bureau of the Census. Housing Characteristics of Recent Movers, Annual Housing Survey, Part D. 1977.

U.S. Department of Commerce, Bureau of the Census. Detailed Housing Characteristics, Alaska. 1970.

U. S. Department of Commerce, Bureau of the Census. Geographical Mobility: March 1975 to March 1979. 1980.

APPENDIX A

TABLE A-1.   EMPLOYMENT BY INDUSTRY
ALASKA URBAN AREAS[1,2]
1980 - 1981

| Industry | 1980 | 1981 | 1982 |
|---|---|---|---|
| Mining | 3,684 | 5,264 | 6,785 |
| Construction | 8,483 | 9,228 | 9,409 |
| Manufacturing | 8,346 | 8,736 | 9,086 |
| Transportation, Communication, and Utilities | 14,468 | 15,309 | 16,071 |
| Trade | 26,404 | 27,835 | 29,110 |
| Finance, Insurance, Real Estate | 7,045 | 7,370 | 7,967 |
| Service | 27,736 | 28,924 | 30,145 |
| Federal Government | 14,922 | 15,367 | 15,367 |
| State and Local Government | 27,325 | 27,917 | 28,481 |
| Other Employment | 991 | 1,079 | 1,156 |

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[1]Includes Anchorage, Fairbanks, Kenai, Seward, Kodiak, Matanuska-Susitna, Southeast Fairbanks, Valdez, Sitka, Ketchikan, and Juneau Census Divisions.

[2]Based on state control forecast presented in Alaska Economic Information and Reporting System, Quarterly Report, November 1980, Alaska Office of the Governor.

TABLE A-2.   EMPLOYMENT BY OCCUPATION
ALASKA URBAN AREAS[1]

| Occupation | 1980 | 1981 | 1982 |
|---|---|---|---|
| Management and Administration | 14,244 | 14,957 | 15,599 |
| Professional and Technical | 22,795 | 23,788 | 24,613 |
| Services | 22,124 | 23,180 | 24,180 |
| Maintenance and Production | 40,898 | 43,906 | 46,244 |
| Clerical | 32,311 | 33,780 | 35,178 |
| Sales | 7,032 | 7,410 | 7,763 |
| Unemployed[2] | 13,107 | 13,888 | 14,550 |
| Not in the Labor Force[2] | 176,294 | 186,791 | 195,826 |

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[1]Derived from employment projections and occupational distribution by industry found in the State's Occupational Employment Statistics program's occupational employment survey conducted in 1978 and 1979.

[2]Assumes historical average of 8.6 percent unemployment and 46 percent labor force participation throughout.

TABLE A-3.   PROPORTION HEADS OF HOUSEHOLD
BY OCCUPATION

| Occupation | Percent of Employees Who Are[1] Household Heads |
|---|---|
| Professional and Technical | .73 |
| Management and Administration | .93 |
| Sales | .46 |
| Clerical | .22 |
| Maintenance and Production | .82 |
| Service | .33 |
| Unemployed | .31 |
| Not in the Labor Force | .096 |

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[1]Based on distribution in Survey of Income and Education, Bureau of Census, 1976.  Adjusted to reflect household total estimated for 1978 in Electric Power Consumption for the Railbelt.

TABLE A-4.   OUT-MIGRANTS AND MOVERS RATES
BY AGE OF HOUSEHOLD HEAD

| Age | Percent Out-migrating in One Year | Percent Moving During One Year |
|-----|-----------------------------------|--------------------------------|
| < 25 | 16.3 | 13.0 |
| 25-50 | 13.1 | 12.0 |
| 50 < | 3.0 | 3.0 |

SOURCE:   National averages from Bureau of Census, Geographic Mobility,
p. 20, No. 353; Table 9, "Metropolitan Mobility by Age, Sex,
and Relationship to Head of Household," p. 22.

TABLE A-5.  HOUSING DEMAND BY LIFE CYCLE GROUP

(In-migrants and Movers)

| | < 2 Years | | | 3 - 5 Years | | | 6 + Years | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 - 2 | 3 - 5 | 6 + | 1 - 2 | 3 - 5 | 6 + | 1 - 2 | 3 - 5 | 6 + |
| **1981** | | | | | | | | | |
| Age | | | | | | | | | |
| < 25 | 1,180 | 1,481 | 87 | 80 | 91 | 12 | 304 | 207 | 7 |
| 25-50 | 3,140 | 8,097 | 2,447 | 293 | 566 | 454 | 900 | 2,379 | 1,170 |
| 50 < | 1,099 | 610 | 236 | 15 | 35 | 6 | 305 | 155 | 80 |
| **1982** | | | | | | | | | |
| Age | | | | | | | | | |
| < 25 | 1,142 | 1,473 | 68 | 67 | 77 | 9 | 225 | 174 | 6 |
| 25-50 | 3,151 | 8,414 | 2,528 | 225 | 491 | 395 | 782 | 2,067 | 1,017 |
| 50 < | 1,099 | 699 | 236 | 15 | 34 | 6 | 296 | 151 | 77 |

TABLE A-6.   HOUSEHOLD INCOME DISTRIBUTION
BY AGE OF HEAD OF HOUSEHOLD

| Income (1976$) | Age < 25 | Age 25 - 50 | Age 50 < |
|---|---|---|---|
| < $20,000 | .528 | .282 | .232 |
| $20-30,000 | .249 | .262 | .242 |
| $30-40,000 | .158 | .211 | .220 |
| $40-50,000 | .053 | .120 | .130 |
| $50-70,000 | .012 | .104 | .136 |
| $70-100,000 | – | .020 | .026 |
| $100,000 < | – | .001 | .014 |

TABLE A-7.   SAVINGS BY INCOME BY AGE OF HOUSEHOLD HEAD

(000's of 1976 $)

| Age | | | | Income | | | |
|-----|------|-------|-------|-------|-------|--------|-------|
| | < 20 | 20-30 | 30-40 | 40-50 | 50-70 | 70-100 | 100 < |
| < 25 | | | | | | | |
| Savings | | | | | | | |
| < 1 | .62 | .25 | .36 | .17 | – | – | – |
| 1 – 2 | .10 | .20 | .36 | .17 | – | – | – |
| 2 – 3 | .09 | .10 | .07 | .33 | – | – | – |
| 3 – 4 | .04 | .10 | .07 | – | – | – | – |
| 4 – 5 | .01 | .05 | – | – | – | – | – |
| 5 < | .15 | .30 | .14 | .33 | 1.0 | – | – |
| 25 – 50 | | | | | | | |
| Savings | | | | | | | |
| < 1 | .39 | .19 | .15 | .05 | .03 | – | – |
| 1 – 2 | .15 | .13 | .06 | .06 | .04 | – | – |
| 2 – 3 | .08 | .14 | .09 | .11 | .07 | .06 | – |
| 3 – 4 | .08 | .06 | .08 | .05 | .04 | – | – |
| 4 – 5 | .04 | .03 | .05 | .03 | .01 | – | – |
| 5 < | .26 | .45 | .58 | .71 | .80 | .94 | 1.0 |
| 50 < | | | | | | | |
| Savings | | | | | | | |
| < 1 | .16 | .05 | .06 | .05 | .03 | – | – |
| 1 – 2 | .02 | .13 | .05 | – | .05 | .14 | – |
| 2 – 3 | .11 | .08 | .08 | .05 | .03 | – | – |
| 3 – 4 | .04 | .04 | .06 | .05 | .03 | – | – |
| 4 – 5 | .05 | .03 | .02 | .05 | .05 | .14 | – |
| 5 < | .63 | .68 | .74 | .81 | .82 | .71 | 1.0 |

SOURCE:   1976 SIE

TABLE A-8.   PREVIOUS TENURE OF RECENT MOVERS BY AGE

| Age of Household Head | Previous Unit Owner Occupied | Previous Unit Renter Occupied |
|---|---|---|
| < 25 | .08 | .92 |
| 25 - 50 | .35 | .65 |
| 50 < | .49 | .51 |

SOURCE:   Housing Characteristics of Recent Movers, Annual Housing Survey
          1977, Bureau of the Census (Table E-2).

TABLE A-9.  CUMULATIVE DISTRIBUTION OF
ANCHORAGE HOUSE SALES BY PRICE (1979)[1,2]

| Price as a Proportion<br>of Average | Proportion of Sales |
|:---:|:---:|
| 40% | 2% |
| 60% | 8% |
| 80% | 24% |
| 90% | 35% |
| Average | 54% |
| 110% | 70% |
| 120% | 82% |
| 140% | 92% |
| 160% | 94% |
| 180% | 98% |
| 200% | 99% |

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[1] Based on analysis of sales in 1979 provided by Anchorage Multi-listing Service.  Distribution in 1980 was similar.

[2] Cumulative distribution describes the proportion of sales below a given price.