

HOUSING IN THE 1980S:
A REVIEW OF ALTERNATIVE FORECASTS

by

William C. Apgar, Jr.

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Introduction

Between 1975 and 1979, a series of housing market forecasts predicted that the aging of the baby boom generation as well as the continuing need to upgrade the existing housing stock would spark record-level new construction activity in the 1980s. Researchers at the U.S. Forest Service, the Urban Institute, the National Association of Home Builders, and Data Resources, Inc., among others, published projections that new construction would add 24 to 28 million units to the housing stock over the decade.¹

The plunge of the housing industry into deep recession in the early 1980s caused many forecasting groups to reduce their estimates of total production for the decade, yet there is little reason to believe that the revised forecasts are any more accurate than those they replace. Like earlier projections, the more recent housing market forecasts fail to capture how demographic factors influence patterns of demand and, in particular, household growth. In addition, they take little account of factors that influence losses, conversions, and other forms of housing investment and disinvestment. Although existing models may forecast total housing market activity accurately, they have little chance of correctly identifying important trends in the composition of new construction by location, by size, or structure type.

This paper presents a baseline forecast of likely trends in household formation and housing construction activity in the 1980s. Following an assessment of national trends, the paper presents

forecasts for each of nine census divisions and discusses important regional variations in household formation and new construction activity. The paper then compares the ability of selected housing market models to track changes in demographic patterns and uses of the existing inventory, and concludes with recommendations for a program of housing research and model development. Principal findings reported in this paper include:

(1) Declines in the growth rate of households and in net losses imply that new construction plus mobile home shipments for the decade of the 1980s most likely will equal 18.9 million units but could be as low as 16.9 million units.

(2) Forecasts of future housing consumption and investment activity require an understanding of how the existing housing stock adjusts to changing economic conditions. In failing to model losses and non-new construction additions to the inventory, available forecasts provide an inadequate basis for assessing future trends in new construction activity.

(3) Each of the forecasts surveyed in this paper attempts to estimate the growth of households by age of household head without explicitly modeling the family formation process. Characteristics of families and individuals other than age, however, are important determinants of household formation and housing choice. A more appropriate approach would be to project the number of families by type, and then to model the effects that income, housing prices, and other economic variables have on housing demand.

(4) It is feasible to construct an improved model for projecting future housing trends. The model must be sufficiently disaggregated to represent the way changes in family structure influence housing demand. Equally important, it must include sufficient detail to permit assessment of how changing economic conditions affect use of the existing inventory. Since characteristics of households and of the housing stock differ both across and within regions, a successful forecasting model must also contain spatial detail.

Moving from the 1970s to the 1980s: A Baseline Forecast

By definition, changes in the total housing inventory must equal growth in the number of households plus changes in the number of vacant housing units. Similarly, growth in the total inventory must equal new construction activity (conventional new construction plus mobile home placements) less net losses (total losses less non-new construction additions). These simple definitions are widely used among housing market forecasters and provide a useful framework for comparing alternative projections.

In the decade of the 1970s, new construction added 20.9 million units to the total housing inventory. Accounting for net losses of 2.6 million units, these additions generated a 18.3 million units increase in the total housing stock for the decade. Although there has been much disagreement over the components of inventory change, it is clear that net losses in the 1970s were substantially lower than in the previous decade, i.e., 3.7 percent compared with 10.9 percent in

the 1960s. Moreover, the decline in net losses in the 1970s substantially reduced the level of new construction required to meet the growth of households and maintain a given level of vacant units.²

The dramatic reduction in net losses resulted from both a decline in gross losses and an increase in non-new construction additions. Gross losses from the conventional inventory (total units less mobile home and seasonal vacancies) fell from an estimated 10.7 percent over the 1960s to 7.6 percent during the 1970s. High losses among mobile home units, however, offset some of this reduction in gross losses from the conventional inventory. By the 1970s, mobile home losses were 19.0 percent of total losses, up substantially from the 6.3 percent recorded in the 1960s. The rise in mobile home losses reflects both the growth of these units as a percent of the total inventory and the fact that mobile homes tend to have shorter useful lives than conventional housing.

The increase in non-new construction additions to the inventory also reduced net losses in the 1970s. Conversion of single-family homes into two or more units, adaptive reuse of commercial and industrial structures as residences, and other changes to the existing inventory added at least 2.7 million, and more likely as many as 3.9 million, units to the stock. It should be noted that even the lower of these two estimates is still nearly twice the number of non-new construction additions that the Bureau of the Census reported for the period 1960-1970.³

Despite declines in net loss rates over the past 20 years, analysts routinely assumed until recently that the high loss rates of the

1960s would continue into the 1980s. For some areas, this was a valid assumption, i.e., in the central cities of the Northeast and North Central regions. For the remaining portions of the country, however, loss rates dropped sharply. Failure to distinguish this trend seriously distorted forecasts for the 1980s. As Table 1 shows, the National Association of Homebuilders forecast that net losses in the current decade would equal 12.3 million units, while the U.S. Forest Service, Data Resources, Inc., and John Weicher projected loss levels between 6.9 to 9.0 million units. Although these estimates are plausible relative to the experience of the 1960s when net losses totaled 6.6 million units, they seem unrealistically high in light of the fact that net losses in the 1970s fell to only 2.7 million units.

Housing market forecasters did little better in capturing trends in household formation. After growing steadily in the 1950s and 1960s, household headship rates soared in the early 1970s. As the baby boom aged, the number of adults rose rapidly; the probability that any given adult would form an independent household also increased. Although analysts began to note the change in household formation rates as early as the 1960s, they failed to anticipate how rapidly headship rates would rise and therefore how rapidly the number of households would grow.⁴

Given the continued growth in headship rates in the early and mid-1970s, the Census Bureau revised its forecasts of household formation three times between 1975 and 1979. While using different time periods and assumptions to form their extrapolations of headship rates, their most recent and most widely used projection places household growth in

Table 1

EARLY FORECASTS OF HOUSING IN THE 1980S
(Thousands of Units)

Forecaster	Household Formation	Additional Vacancies	Growth of Total Inventory	Net Losses	New Construction
National Association of Homebuilders, 1975	11,400	3,900	15,300	12,300	27,700
Thomas Marcin, U.S. Forest Service, 1977	14,580	1,600	16,180	9,070	25,250
Data Resources, Inc. 1978	16,000	1,600	17,600	6,900	24,500
John Weicher, Urban Institute, 1980	16,940	1,850	18,790	7,960	26,750

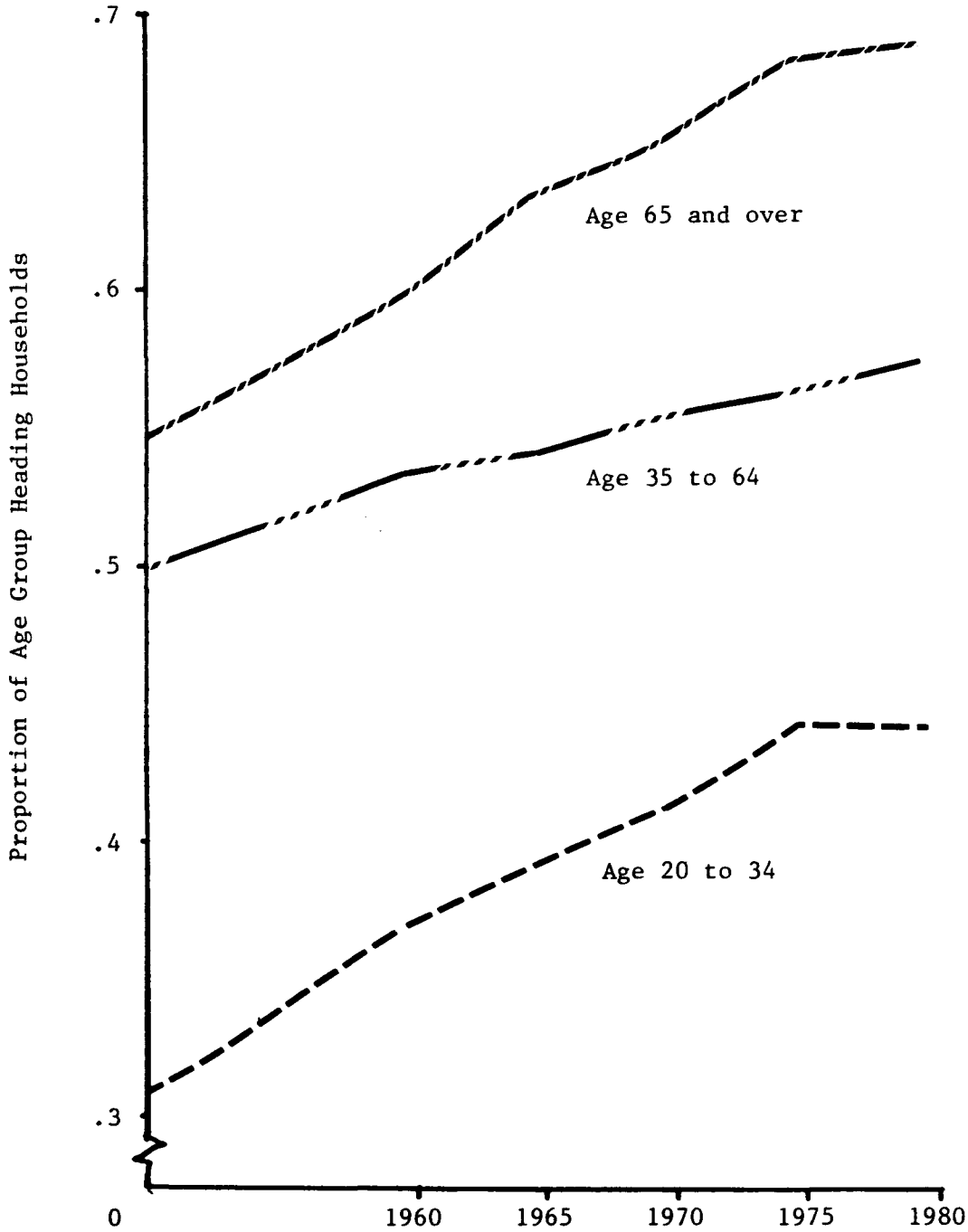
SOURCES: National Association of Homebuilders, "Housing Requirements for 1975-1990," in U.S. Senate, Committee on Banking, Housing and Urban Affairs, Estimates of Housing Needs (Washington, D.C.: U.S. Government Printing Office, September 1975); Robert Gough and Robin Siegel, "The Fundamentals of Long-Run Housing Demand," Data Resources Review, Spring 1978; Thomas C. Marcin, Outlook for Housing by Type of Unit and Region: 1978 to 2000 (Madison, Wisconsin: U. S. Forest Service, Forest Products Laboratory, 1977); John Weicher, Lorene Yap and Mary S. Jones, Metro-politan Housing Needs for the 1980s (Washington, D.C.: The Urban Institute Press, 1982).

the 1980s at 16.8 million. Several forecasters—including the U.S. Forest Service in 1977, and Data Resources, Inc. in 1978—followed the lead of the Census Bureau and also revised their projections upwards. Like the Census Bureau, each of these forecasts assumed that headship in the 1980s would continue to grow at rates experienced in the late 1960s and early 1970s.

More recent data suggest that this is unlikely. As Figure 1 shows, crude headship rates for the age group 20-34 have remained virtually constant since 1975. For those aged 25-34, the headship rate only increased from 49.7 percent in 1975 to 49.9 percent in 1982. Among the 20-24 age group, the 1982 headship rate was up slightly to 15.0 percent from the 1975 figure of 14.6 percent.⁵

In their detailed analysis of household formation, John Pitkin and George Masnick of the MIT-Harvard Joint Center for Urban Studies examined forces leading to a diminished growth in headship rates. This research examines the probability of individual family nuclei—i.e., families or other groupings of related individuals such as a single-parent and children—forming separate households. While many analysts focus on the effect of age in the decision to head a household, Pitkin and Masnick suggest that other important factors in the choice include marital status and the presence or absence of children. Other things being equal, a woman with young children, for example, is more likely to maintain a separate household than a childless woman. Headship probabilities differ according to whether a woman is widowed, divorced, or never married. In short, the Pitkin and Masnick analysis demonstrates that demographic characteristics have important implications for future growth of households.

FIGURE 1
Headship Rates by Age Class, 1950-1980



SOURCE: Census of Population, 1950 and 1960; Current Population Reports, Series P-20 and P-25, selected numbers.

This slowdown in the growth in headship rates among young adults is noteworthy in that this age group contributed to much of the increase in total households in the late 1960s and early 1970s. Indeed, slower growth in headship rates is a central ingredient in the Joint Center's forecast of diminished household growth for the next two decades. During this period, the average annual increase in number of households will fall from the 1.5 million level forecast for the 1980s to 1.1 million in the early 1990s, and close to 1.0 million by the end of the century.⁶

Table 2 compares a baseline forecast for the 1980s consistent with these trends and the levels experienced in the 1970s. The baseline forecast assumes that 14.8 million households will form over the 1980s, a substantial decline from the 16.8 million in the previous decade. Assuming that the occupancy rate holds constant at the 1980 level of approximately 91 percent, the slowdown in household growth will produce an equally pronounced drop in the growth of vacant units. If losses continue at rates observed in the period 1975-1980 and non-new construction additions continue to provide the same share of total additions as they did in the 1970s, the baseline forecast places gross losses for the decade at 6.1 million units, non-new construction additions at 3.4 million units, and net losses at 2.6 million units. The forecast of reduced household formation and reduced inventory losses implies that new construction will equal but 18.9 million units, including about 2.7 million mobile home placements.

Changing economic conditions could, of course, modify both household formation rates and net loss rates. With the sluggish economy

Table 2

HOUSEHOLD FORMATION, CHANGE IN TOTAL AND VACANT HOUSING STOCK,
NET LOSSES, AND NEW CONSTRUCTION PLUS MOBILE HOME SHIPMENTS:
1970-1980 (ACTUAL) AND 1980-1990 (FORECAST)

	Actual 1970s		Forecast 1980s	
	Millions of Units	As Percent of Beginning of Decade Stock	Millions of Units	As Percent of Beginning of Decade Stock
Initial Period Stock	70.18	100.0%	88.56	100.0%
Household Formation	16.80	23.9	14.84	16.8
Additional Vacancies	1.59	2.3	1.43	1.6
Growth of Total Stock	18.38	26.2	16.27	18.4
Net Loss:	2.56	3.7	2.63	3.0
Gross Loss	6.50	9.3	6.07	6.9
Non-new Construction Additions	3.94	5.6	3.44	3.9
New Construction Plus Mobile Home Shipments	20.94	29.8	18.90	21.3
End of Decade Stock	88.56	126.2	104.83	118.4

SOURCE: Joint Center forecasts, June 1983.

and low levels of household formation recorded in the early 1980s, the estimate of 14.8 million new households could be too high; a period of vigorous and sustained economic growth, however, could push household growth to 15.8 million. Alternatively, net losses could increase in the 1980s. Strong economic growth, together with the continued shift of households from city to suburb and from frostbelt to sunbelt could raise loss rates. While it is unlikely that they will ever return to 1960s levels, it is possible that net losses could increase to a decade rate of 4.0 percent.

As in Table 3 shows, only a high level of household formation together with a return to high levels of net losses would produce new construction plus mobile home shipments that would equal or exceed the number achieved in the 1970s. A more likely estimate of new construction activity in the 1980s is 18.9 million units, or 10 percent lower than in the previous decade. Moreover, housing production could fall even further if household growth fails to reach the most likely level of 14.8 million.

Despite this pessimistic assessment for the decade as a whole, it is important to note that housing production will increase sharply from the depressed levels experienced between 1980 and 1982; sustaining higher production levels into the late 1980s and 1990s, however, will be difficult. As the baby boom generation ages, household formation rates and housing construction activity will begin a downward drift that will last until the year 2000. As discussed in the section below, moreover, not all the regions of the country will share equally in housing production.

Table 3

NEW CONSTRUCTION PLUS MOBILE HOME PLACEMENT
FOR THE 1980s
(Millions of Units)

Household Formation	Net Loss Rate		
	Low 2.0 Percent	Most Likely 3.0 Percent	High 4.0 Percent
<u>Low</u>			
13.8 million	16.9	17.8	18.7
<u>Most Likely</u>			
14.8 million	18.0	18.9	19.8
<u>High</u>			
15.8 million	19.1	20.0	20.9

SOURCE: Joint Center forecasts, June 1983. Most likely forecast for new construction plus mobile home placements is 18.9 million. Other forecasts are for discussion purposes only.

Regional Trends in Housing Construction

The regional variation in household growth observed in the 1970s is expected to continue in the 1980s. As Table 4 shows, the population of the Northeast grew by only 94,000 in the 1970s, with the New England states gaining 506,000 people and the Mid Atlantic states losing 412,000. While the large central cities of the Northeast had been decreasing in population since the 1950s, by the 1970s numerous inner suburban areas were also losing residents. Joint Center projections suggest that with the State of New York leading the way, population in the Mid Atlantic states will decline by as much as 6.4 percent in the 1980s. Almost no population growth is forecast for the East North Central states, as well. Having grown by only 3.5 percent in the 1970s, the population of these states is likely to increase by only 1.2 percent over the current decade.

The population in the sunbelt, in contrast, is projected to grow significantly faster than the national average. Relative to the 1970s, however, the rate of population growth will decrease somewhat in the Pacific and Mountain states and more sharply in the South Atlantic states. The West South Central and East South Central states are projected to experience the largest absolute population increase of 6.3 million.

Although population growth is a major determinant of household growth, the number of households can increase at a greater rate than the number of people if average household size continues to decline. As the data in Table 5 indicate, the rate of household growth in the 1970s exceeded the rate of population growth in each of the nine

Table 4

POPULATION GROWTH BY REGION:
1970-1980 (ACTUAL) AND 1980-1990 (FORECAST)

Region Census Division	Population (000s)			Decade Growth Rate	
	Actual 1970	Actual 1980	Forecast 1990	Actual 1970-1980	Forecast 1980-1990
Northeast	49,041	49,135	47,707	0.2%	-2.9%
New England	11,842	12,348	13,142	4.2	6.4
Mid Atlantic	37,199	36,787	34,562	-1.1	-6.4
North Central	56,572	58,854	61,274	4.0	4.1
East North Central	40,253	41,670	42,151	3.5	1.2
West North Central	16,319	17,184	19,123	5.3	11.3
South	62,795	75,353	89,921	20.0	19.3
South Atlantic	30,671	36,943	41,785	20.5	13.1
East South Central	12,803	14,663	18,079	14.5	22.8
West South Central	19,321	23,747	30,057	22.9	26.6
West	34,805	43,165	52,949	23.9	22.7
Mountain	8,282	11,368	15,416	37.2	35.6
Pacific	26,523	31,797	37,533	19.8	18.0
Total	203,212	226,505	251,848	11.4	11.2

SOURCE: U.S. Bureau of Census, 1980 Census of Population, Standard Metropolitan Statistical Areas - 1980, Supplementary Reports PC80-S1-5 (Washington, D.C.: U.S. Government Printing Office, 1981) and Joint Center projections, June 1983.

Table 5

COMPARISON OF POPULATION AND HOUSEHOLD GROWTH:
1970-1980 (ACTUAL) AND 1980-1990 (FORECAST)

Region Census Division	1970-1980		1980-1990	
	Population Growth Rate	Household Growth Rate	Population Growth Rate	Household Growth Rate
Northeast	0.2%	12.4%	-2.9%	4.5%
New England	4.2	19.5	6.4	15.5
Mid Atlantic	-1.1	10.3	-6.4	0.8
North Central	4.0	18.8	4.1	10.8
East North Central	3.5	18.2	1.2	8.0
West North Central	5.3	20.1	11.3	17.4
South	20.0	37.1	19.3	27.1
South Atlantic	20.5	39.0	13.1	21.7
East South Central	14.5	29.8	22.8	30.8
West South Central	22.9	39.0	26.6	33.5
West	23.9	39.2	22.7	28.9
Mountain	37.2	58.1	35.6	42.8
Pacific	19.8	33.7	18.0	24.1
Total	11.4%	26.4%	11.2%	18.3%

SOURCE: See Table 4.

census divisions. Even in the Mid Atlantic region, which lost population in the 1970s, the number of households grew by 10.3 percent.

In the future, households will continue to increase at a faster rate than population, but the difference will be less pronounced. While the projected population increase of 11.2 percent is practically identical to that experienced in the 1970s, the household growth rate is projected to drop from the 1970s figure of 26.4 percent to 18.3 percent. Even sharper declines are forecast for selected regions: in the Mid Atlantic states, for example, household growth is projected to fall from 10.3 percent to under 1.0 percent. Although still above average, the household growth rate in the South Atlantic and Pacific states will drop as well, reflecting the slowdown in population growth in Florida and California.

The flow of population and households away from selected frostbelt states suggests that the Northeast and North Central regions will capture smaller shares of national housing market activity. As indicated in Table 6, the biggest declines in the shares of total housing production will occur in the Mid Atlantic and East North Central states. In contrast, both New England and the West North Central divisions will experience slight increases in their shares of total new housing production. As a whole, the Northeast and North Central regions will capture 27.7 percent of new construction plus mobile home placements in the 1980s, down from 33.9 percent in the 1970s.

As household growth slows, forecasts of total construction activity are increasingly influenced by forecasts of the other components of inventory change, i.e., changes in vacancies, losses, and non-new

Table 6

PERCENT DISTRIBUTION OF HOUSEHOLD GROWTH AND NEW
CONSTRUCTION PLUS MOBILE HOME SHIPMENTS BY REGION:
1970-1980 (ACTUAL) AND 1980-1990 (FORECAST)

Region Census Division	Household Growth		New Construction Plus Mobile Home Shipments	
	1970-1980	1980-1990	1970-1980	1980-1990
Northeast	11.5%	5.3%	11.8%	8.5%
New England	4.2	4.5	3.6	4.2
Mid Atlantic	7.3	0.7	8.2	4.3
North Central	19.7	15.3	22.1	19.2
East North Central	13.5	8.0	14.7	11.3
West North Central	6.2	7.3	7.4	7.9
South	42.8	48.9	42.4	45.9
South Atlantic	22.0	19.4	21.5	19.4
East South Central	6.9	10.6	7.5	9.5
West South Central	13.9	18.9	13.4	17.0
West	26.1	30.6	23.7	26.4
Mountain	8.7	11.7	8.1	9.9
Pacific	17.4	18.9	15.6	16.5
Total	100.0%	100.0%	100.0%	100.0%
Number (thousands)	16,800	14,840	20,935	18,897

SOURCE: See Table 4.

construction additions. In the Mid Atlantic region, for example, households will increase by only 110,000 in the 1980s, but new construction for the decade will equal 812,000 units; this discrepancy is largely due to the fact that new construction is needed to offset the nearly 1 million units that will be lost during the decade. In forming these estimates, it was assumed that the vacancy rate would remain unchanged, an assumption consistent with historical experience. As household growth slows to near zero in this division, however, it is possible that vacancies will increase. If the vacancy rate for the Mid Atlantic states were to rise by one percent, the housing stock (and hence new construction) would have to increase by an additional 140,000 units.

Review of Alternative Forecasts

Forecasts of housing consumption and investment activity require an understanding of the way in which both households and the housing stock adjust to changing economic conditions. New construction adds but a small increment each year to the total housing inventory. Even after a decade of record-level new construction activity, four out of every five American households in 1980 lived in a unit that existed in 1970. The location, quality, and other characteristics of the current inventory thus play an important, although frequently ignored, role in shaping housing market trends.

Demographic characteristics and household formation patterns also influence housing market behavior. The formation of new households and the composition of existing households depend not only on economic

factors governing the cost and availability of housing, but also on social norms such as marriage rates, divorce rates, and the age at which children leave their parents' homes. Like the characteristics of the existing housing stock, the current characteristics of families and households have important implications for the future.

In attempting to capture the many economic and social factors that influence housing investment and consumption decisions, housing analysts employ a variety of techniques ranging from simple trend-line extrapolations to complex simultaneous equation models. The work of the ten forecasting groups listed in Table 7 illustrates this diversity. Researchers at Data Resources, Inc. (DRI), for example, employ one of the largest and most complex macroeconomic models of the national economy in use today, yet supplement the results of this model with simple trend-line forecasts. The same is true for Morgan Stanley and Company, whose housing forecasts are based in part on the results of the national macroeconomic model of Townsend Greenspan, Inc. and in part on supplementary analyses of factors not included in the national model.

Although it is useful to think about housing in the context of the national economy, macroeconomic models typically contain only limited detail about the housing sector. The DRI model, for example, forecasts single-family and multi-family housing starts and mobile home placements for the next 25 years, but not of the number and composition of households living in these units. To supplement their national models, analysts at DRI and elsewhere have therefore developed special housing sector models. The Regional Data Associates

Table 7

SELECTED HOUSING MARKET FORECASTS

Forecasting Group	Recent Publications
Advance Mortgage Corporation	"U.S. Housing Markets," July 31, 1981.
Data Resources, Inc.	"Realities of Long-run Housing Demand," <u>Data Resources U.S. Long-Term Review</u> , Fall 1981.
Anthony Downs	<u>Search for Space: Rental Housing in the 1980s</u> , draft report, Summer 1982.
Thomas C. Marcin Forest Products Laboratory	"Outlook for Housing by Type of Unit and Region: 1978 to 2020," U.S.D.A. Forest Service Research Paper, 1977.
Morgan Stanley and Company	"Outlook for Timber Supply/ Demand through 1990," text of speech delivered by Thomas P. Clephawe to Workshop on Financing Forestry Investment, Duke University, May 10, 1982.
National Association of Homebuilders	"The Eighties: After a Slow Start, Some Very Good Years," <u>Builder</u> , January 7, 1980.
Regional Data Associates Kenneth Rosen and Dwight Jaffee University of California, Berkeley Princeton University	"The Demand for Housing and Mortgage Credit: The Mortgage Credit Gap Problem," paper prepared for FNMA Symposium on Housing Finance in the Eighties, February 1981.
George Sternlieb and James W. Hughes Rutgers University	"Housing: Past and Future," paper prepared for FNMA Symposium on Housing Finance in the Eighties, February 1981.
John Weicher, Lorene Yap, and Mary Jones The Urban Institute	<u>Metropolitan Housing Needs for the 1980s</u> (Washington, D.C.: The Urban Institute, 1982).
U.S. Bureau of the Census	"Projections of the Number of Households and Families: 1978-1995," <u>Current Population Reports</u> , P-25, May 1979.

model, initially developed by Kenneth Rosen and Dwight Jaffee, is an example of this type, as are the models of Thomas Marcin of the U.S. Forest Service, John Weicher of the Urban Institute, and researchers at Advance Mortgage Corporation.

Taking as given certain parameters about the future of the national economy, each model nonetheless emphasizes different aspects of the housing market. The most recent version of the RDA/Rosen/Jaffee/ model, for instance, incorporates considerable detail about housing finance and includes a simple model of household formation, but treats as exogenous the rates of net loss to the existing inventory.⁷ In contrast, Weicher does not attempt to model household formation but uses the available Census Bureau forecasts; he focuses instead on modeling the components of inventory change, including losses. Marcin pays more attention to the details of the household formation process than RDA/Rosen/Jaffe, but less attention than Weicher to the details of housing inventory adjustment.

In addition to these formal models, many analysts make qualitative assessments of the future of the housing industry. As part of the multi-year study on urban decline and the future of the American city, Anthony Downs of the Brookings Institution has developed estimates of likely trends in housing construction and investment. Downs combines the Census Bureau forecasts of household formation with independent economic analyses of inventory adjustment to form alternative forecasts of housing market activities. George Sternlieb takes a similar approach in his work on multi-family housing demand. Without the benefit of formal models (or perhaps because they were not bound to

the limitations of a single model), both Downs and Sternlieb offer far-ranging and frequently insightful comments about future housing market dynamics.

To varying degrees, however, housing market forecasters seek to assess the demographic, economic, technological, social, and political factors that affect housing consumption and investment. While it is of course difficult to develop a single model that incorporates all of these complex interactions, current forecasting efforts seem particularly deficient in tracking changes in demographic patterns and in the use of the existing inventory. The next section assesses alternative forecasts of household formation, while the subsequent section evaluates alternative forecasts of the components of inventory change. This review suggests that existing projections of housing market activity are built on the most tenuous of foundations.

Forecasts of Household Formation

The 1970s recorded unusually rapid growth in the number of households and a marked shift in household composition. Between 1970 and 1980, the number of households increased by 16.8 million, compared with 10.6 million in each of the previous two decades. While forecasters expected households to increase in number in the 1970s because of the "arrival" of the baby boom generation into the prime household formation age groups, many analysts, including those at the Census Bureau, failed to anticipate the rapid increases that occurred in the fraction of adults heading households. With growth in income and more generous federal housing programs, more individuals were able to

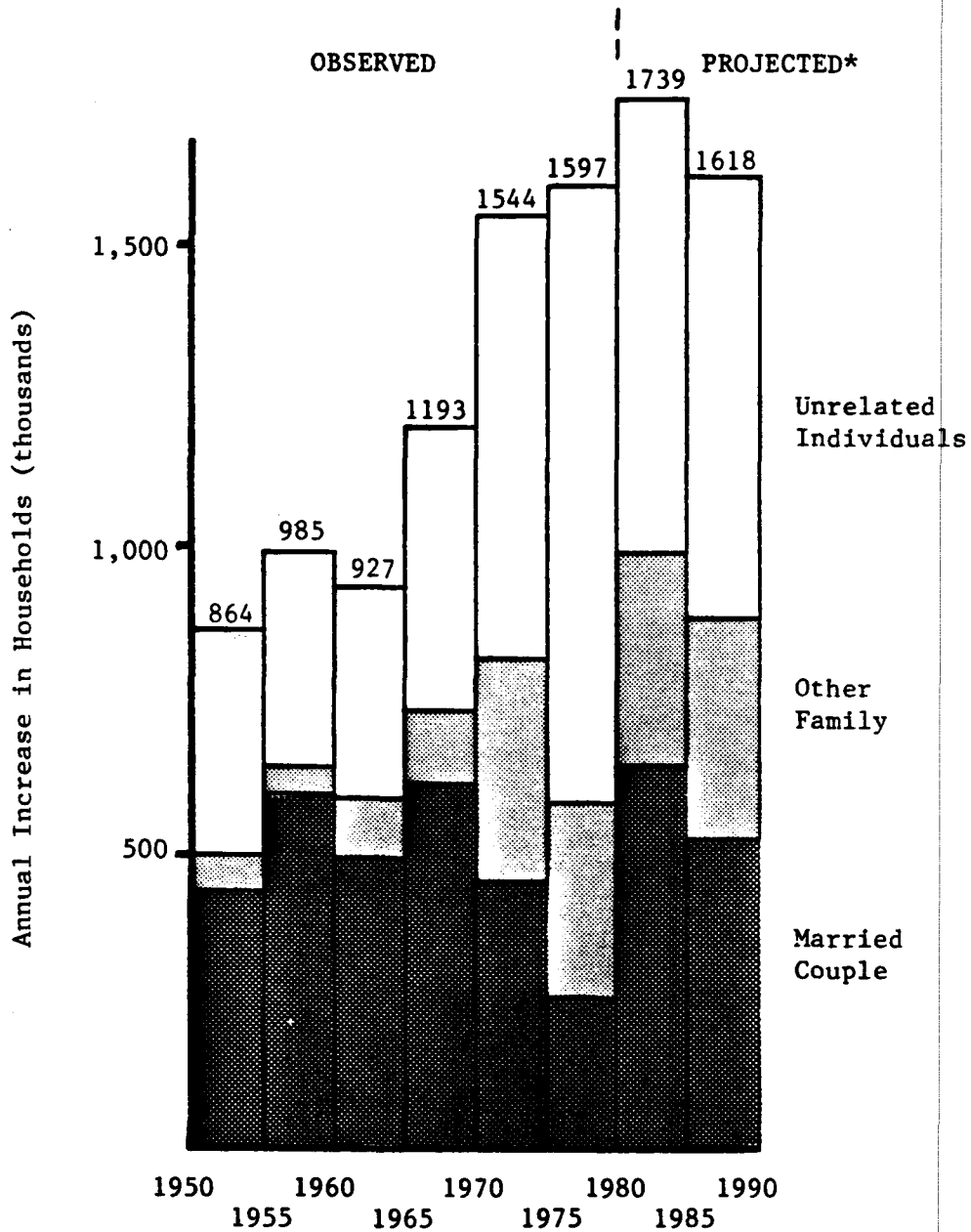
maintain independent households. When actual household growth in the 1970s exceeded expectations, the Census Bureau revised its projections for the 1980s upward. The most recent revision, issued in 1979, estimates that the number of households will increase between 13.0 to 18.8 million, with the "most likely" estimate being 16.8 million.

A dramatic change also occurred in the composition of families and households in the 1970s. In 1950, married couples accounted for almost 80 percent of all households; over 60 percent of new households added during that decade were also married couples. Since 1970, however, married couples constitute a smaller and smaller share of total households as more couples delay marriage, divorce, or simply live together. As Figure 2 illustrates, the number of married couple households increased by only 250,000 each year between 1975 and 1980, compared with an annual growth of all households of 1.6 million. As a result, married couples accounted for less than 15 percent of total household growth during this period, the lowest share ever recorded.

Despite these trends, the Census Bureau's projections for the 1980s imply a resurgence in married couple households above levels observed in the 1970s, and that families other than married couples will continue to grow at approximately the same rates as in the past decade. There is little reason to expect, however, that marriage rates will increase. Since "other families" consist primarily of women with children, for this group to continue growing would require illegitimate births to increase above 1970s levels and divorces to involve more women with children. Since fertility is declining, neither of these events is likely.

FIGURE 2

Annual Increase in Number of Households by Type:
1950-1980 Observed and 1980-1990 Projected



*Census Bureau Series B.

Sources: Current Population Reports, Series P-20,
Nos. 345 and 366; Series P-25, No. 805.

Examination of the Census Bureau's forecasting methodology suggests the source of these errors. Using data for the period 1964-1978, Census Bureau analysts first projected total population by age and sex assuming continuation of observed trends in births, deaths, and net immigration to the country, and then calculated the share of persons of a given age in a particular marital status for each year. The Census Bureau then fit a series of nonlinear equations to the time trends in these shares and used these equations to project future distributions of population by marital status. Also using simple extrapolation procedures, the Census Bureau analysts estimated the probability that a given individual would head a household.

As noted earlier, the Pitkin and Masnick analysis suggests that the Census Bureau forecasts could be wide of the mark. Pitkin and Masnick have pioneered in the use of cohort projection techniques to assess past and likely future trends in population growth, marital status, family size, headship, and housing consumption. In tracking the behavior of birth cohorts, i.e., individuals born during a certain period, this method links the family formation patterns of people who will be 40 years old in 1990, for example, to those of the same people who were 30 in 1980.

Unlike the cohort approach used here, the Census Bureau's analysis of household trends examines the behavior of different people as they reach a given age. Pitkin and Masnick observe, however, that the attitudes of people born in different periods are likely to vary: 30 year-olds of 1965, for example, grew up during the Depression and war

years; the 30-year olds of 1978, in contrast, grew up in fairly affluent times. Cohort analysis provides a simple method for examining these differences and assessing their implications for future trends in family and household formation.

In 1979, the Joint Center first presented forecasts that demonstrated that the widely used Census projection of 16.8 million new households for the 1980s was anywhere from 2 to 3 million too high. Nevertheless, other housing market analysts have continued to use the outdated Census Bureau forecasts of household growth. For example, recent analyses by the Advance Mortgage Corporation and George Sternlieb incorporate the census projections without change; Anthony Downs and John Weicher have also used census forecasts as input, with only minor modifications. Each of these analyses not only overstates the growth in total households but also presents a distorted view of the growth of households headed by individuals of a particular age or marital status.

Although Marcin, Data Resources, and RDA/Rosen/Jaffee have developed economic analyses of household formation, there is little reason to believe that their projections are any more accurate than those of the Census Bureau, especially as they relate to household formation among specific age groups. DRI fits a simple time trend-line to age-specific headship rates using data for the past 30 years. Since headship rates grew more slowly between 1950 and 1980 than between 1964 and 1978, the DRI projections of household growth are lower than Census Bureau forecasts.

Using a slightly different procedure, Thomas Marcin calculates a theoretical maximum headship rate for each age group based on estimated growth in the number of married couples. Marcin then relates annual estimates of age-specific headship for the period 1953-1976 to annual estimates of per capita income, and in essence forces the trend line to approach asymptotically the maximum headship rate. Based on these equations, Marcin generates two sets of estimates of household growth assuming a 1.0 and a 2.0 percent growth in income. Like those of Data Resources, the Marcin estimates of household growth are lower than the Census Bureau's, largely because of his assumptions about maximum headship rates.

RDA/Rosen/Jaffee treat household formation as one of the demand factors in a simultaneous equation model of housing supply and demand. The key variables influencing household headship are changes in real disposable income, in the cost of maintaining a separate housing unit (as proxied by the rental and homeownership component of the Consumer Price Index), and in the unemployment rate. RDA/Rosen/Jaffee estimate separate equations for two household types (family and nonfamily) in each of four age groups (15-24, 25-34, 35-64, and 65+). The number of families with a head aged 65+ is a function of the total number of people aged 65+, income growth, and the homeownership component of the CPI. The number of households aged 35-64 depends, in turn, on the total number of people aged 35-64, the cost of housing, the marriage rate, and the divorce rate.⁸

While household formation appears to be fully endogenous to the RDA/Rosen/Jaffee model, this is more in principle than in fact. Al-

though RDA/Rosen/Jaffee argue forcefully that household formation depends on both economic and social factors, social factors (proxied by marriage and divorce rates) appear in only three of the eight household equations. Marriage and divorce rates thus influence the growth of family households aged 35-64, while the divorce rate influences the growth of nonfamily households aged 25-34 and 35-64. For the five other groups, RDA/Rosen/Jaffee apparently could not develop statistically significant models of the probability that population of a given age group would form households which included marriage rates, divorce rates, and other factors. Indeed, for the group aged 15-24, headship depends only on the growth of income and change in total CPI, two factors that are exogenously specified. As a result, the age group with the greatest potential to change its headship rate is, in fact, not formally represented in the simultaneously determined market process.

The comparison presented in Table 8 illustrates how different assumptions about household formation affect age-specific household forecasts. For example, the Census Bureau predicts a slight growth in the number of households aged 14-25, while the Joint Center forecasts a decline in this group of 1.0 million. Both Data Resources and Marcin also predict declines, although of smaller proportions. Assuming that income grows by one percent per year, Marcin's "low series" projects a decrease in the number of households aged 18-25 of 619,000. It should be noted that the forecasts of Marcin and DRI are surprisingly similar for each of the other age groups, suggesting that Marcin may have simply produced a somewhat more complex representation of the DRI time-trend.

Table 8

COMPARISON OF AGE-SPECIFIC HOUSEHOLD FORECASTS, 1980-1990
(Thousands of Households)

Forecaster	Age of Household Head				Total
	14-25	25-34	35-64	65+	
Joint Center (June 1983)	-1,013	3,837	8,140	3,873	14,837
U.S. Census Bureau, Series 2B (1979)	77	4,420	8,441	3,838	16,783
Data Resources (Fall 1981)	-320	3,115	7,925	3,580	14,300
Thomas Marcin (1977)					
High	-339	3,661	7,937	3,322	14,580
Low	-619	3,141	7,655	3,144	13,319
RDA/Rosen/Jaffe (May 1982)					
Optimistic	704	5,356	8,766	4,334	19,160
Base	432	4,388	8,210	3,625	16,656
Pessimistic	-46	3,705	7,437	2,536	12,632

NOTE: Thomas Marcin forecasts for households 18 years of age and older. Data Resources, Inc. forecasts for households 20 years of age and older.

SOURCE: See Table 7.

RDA/Rosen/Jaffee predict, in contrast, that the number of young households will increase fairly significantly. Their three scenarios include a base forecast assuming a 1.7 percent growth rate in real per capita income and a 9.2 percent inflation rate; a more optimistic forecast assuming that real per capita income will grow at an annual average rate of 3.1 percent, with inflation averaging 6.5 percent for the decade; and a pessimistic forecast assuming that income will fall by 0.3 percent annually and inflation will surge ahead at 12.1 percent. Under baseline conditions, the RDA/Rosen/Jaffee model predicts that headship rates among the group aged 15-25 will continue to rise rapidly, a forecast that runs counter to the experience of the last seven years. Even in their most pessimistic scenario, the basic assumptions of which are extremely unlikely, the RDA/Rosen/Jaffee model forecasts a 20 percent increase in headship rates and only slight declines in the number of households under 25.

The RDA/Rosen/Jaffee, DRI, and Marcin models move directly from forecasting population by age to forecasting households by age without explicitly modeling the intervening step of family formation. The details of the family formation process, however, can and do influence the probability of living independently. Depending on economic factors such as income, relative housing prices, and unemployment levels, a given family nuclei may or may not form a household. Each of the models thus fails to represent fully the economic and demographic forces that shape future patterns of household formation. Rather than starting with a simple forecast of population by age, a model of headship rates and housing formation should begin with a forecast of

population by age, marital status, and presence or absence of children.

Forecasts of Inventory Change

In addition to overstating rates of household formation, current housing forecasts tend to overestimate likely net losses to the inventory. In light of the sharp decline in gross losses and the increase in non-new construction additions since the 1960s, the Joint Center projection assumes that net losses in the 1980s will equal but 2.63 million units. As Table 9 shows, only the pessimistic scenario of the RDA/Rosen/Jaffee model produces net losses this low. Interestingly enough, the Advance Mortgage Corporation forecast equates rapid growth in total households and in the housing stock with lower net losses. For Advanced Mortgage, a low level of household growth apparently implies reduced pressures to conserve the inventory. RDA/Rosen/Jaffee argue, in contrast, that the high cost of new housing both slows household formation and encourages more intensive use of the existing inventory.

With the exception of the Census Bureau, all the forecasters discussed here issue detailed projections of new construction activity. Since Sternlieb limits his forecasts to the rental housing sector, and Weicher to housing construction in metropolitan areas, however, they do not appear in Table 10; also missing is Anthony Downs, who focuses on new construction of owner and renter units. While estimates of total construction differ considerably, the forecasters (with one notable exception) generally agree that the single-

Table 9

COMPARISON OF ALTERNATIVE FORECASTS OF
INVENTORY CHANGE: 1980-1990
(Thousands of Units)

Forecaster	Change in Total Stock	Net Losses	New Construction Plus Mobile Home Placements
Joint Center (June 1983)	16,270	2,627	18,897
Advance Mortgage (July 1981)			
High	17,670	3,080	20,750
Low	13,550	4,200	17,750
Data Resources (Fall 1981)	15,845	4,320	20,165
Anthony Downs (1982)	15,540	4,560	20,100
Thomas Marcin (1977)			
High	16,185	9,068	25,253
Low	14,801	8,374	23,175
Morgan Stanley (May 1982)	n.a.	n.a.	18,890
RDA/Rosen/Jaffee (May 1982)			
Optimistic	18,840	5,060	23,900
Base	16,510	4,010	20,530
Pessimistic	11,870	2,490	14,360
John Weicher (1980)	18,786	7,956	26,742

SOURCE: See Table 7.

Table 10

COMPARISON OF ALTERNATIVE FORECASTS OF
NEW CONSTRUCTION BY TYPE: 1980-1990
(Thousands of Units)

Forecaster	Single-family	Multi-family	Mobile Homes	Total
Advance Mortgage				
High	n.a.	n.a.	2,500	20,750
Low	n.a.	n.a.	2,500	20,750
Data Resources (Fall 1981)	11,045	6,000	3,120	20,165
Thomas Marcin (1977)				
High	16,393	5,335	3,524	25,253
Low	15,249	4,706	3,220	23,175
Morgan Stanley (1982)	8,520	6,980	3,390	18,890
RDA/Rosen/Jaffee (May 1982)				
Optimistic	13,720	6,450	3,720	23,900
Base	12,200	5,250	2,070	20,530
Pessimistic	8,560	3,610	2,190	14,360

SOURCE: See Table 7.

family share of conventional new construction in the 1980s will be between 65 and 75 percent. The Morgan Stanley forecast, prepared in consultation with Townsend-Greenspan, presents quite a different view. Reacting to record mortgage interest rates and what they see as the general disarray of the thrift industry, Morgan Stanley assumes that homeownership affordability problems will severely limit the demand for new single-family homes over the next ten years. As a result, they predict that the single-family share of conventional new construction will decline to 50 percent by 1990. Although offering no exact figures, Sternlieb makes a similar assessment: new construction in the 1980s will be less oriented toward single-family homes and more towards townhouses and multi-family structures as American consumers adapt their expectations to the realities of their limited purchasing power.

Whether single-family housing starts are 50 percent or 75 percent of total new construction, of course, makes a considerable difference in the capital and material needs of the housing industry. The Morgan Stanley report notes, for example, that a single-family home uses about twice as much lumber and plywood as multi-family units. There are equally important differences in the financing and construction of single- and multi-family structures. Differential rates of gross losses are also likely to influence the mix of new construction. If loss rates among multi-family units continue to decline, construction levels for these units will also decrease. Moreover, conversions of single-family homes and adaptive reuse of commercial and industrial

space can add significant numbers to the multi-family stock, thus depressing new construction.

Given the important link between use of the existing stock and new construction activity, there has been surprisingly little empirical research on the economic determinants of losses and other additions. Using Annual Housing Survey data for 59 metropolitan areas, Weicher found that loss rates between 1970 and 1976 were higher in areas with a large volume of new construction and lower in areas with high overall growth rates, particularly among areas with predominantly minority households. Weicher included measures of income growth, of growth in the costs of new construction, and of the amount of subsidized housing, but could find no statistically significant relationship between these variables and loss rates. Surprisingly, however, he did not employ measures of the initial quality of the housing inventory, factors that would explain the high loss rates in the Northeast and North Central regions of the country. Nor did Weicher note the tendency for losses to be related to the presence of mobile homes in an area. Inclusion of these variables would likely increase the explanatory power of the loss equation and perhaps lead to a more understandable pattern of coefficients for the other economic variables.

In his analysis of other additions, Weicher finds that conversions are inversely related to the growth in small families, a result that he notes is just the opposite of what should be expected. Weicher concedes that the estimates of non-new construction for particular SMSAs are likely to contain errors, but does not explore these issues.

Given the difficulty of forming even a rough estimate of non-new construction additions in the 1970s, forecasting future trends in this type of housing production is a perilous exercise. Yet non-new construction additions are simply too important to ignore: even the lower-bound estimate of 2.7 million non-new construction additions for the 1970s implies that this source of inventory adjustment was more than twice as large as in the 1960s. As Table 11 indicates, the Joint Center projections predict that non-new construction additions will account for 3.4 million units in the 1980s. Against these figures, the Weicher estimate of non-new construction additions seems too low, and that of the Advance Mortgage Corporation too high, with the DRI's estimate being most plausible.

Data problems limited the ability of the other forecasters to analyze fully the effect of changing patterns of inventory losses and other additions. Marcin made no distinction between gross losses and other additions but instead attempted to explain variation in net losses over time and across regions as a function of economic variables such as growth of income, capital cost, housing prices, and housing operating costs. Marcin reported that net housing replacement is related to these economic variables, but that his equations were highly unstable.

Since RDA/Rosen/Jaffee were also unable to develop sound econometric estimates of the determinants of net loss rates, they were forced to make the net loss rate exogenous to their model. For each scenario, they therefore had to determine a consistent net loss rate, i.e., 50 percent between the optimistic and pessimistic scenarios,

Table 11

COMPARISON OF ALTERNATIVE FORECASTS OF LOSSES
AND NON-NEW CONSTRUCTION ADDITIONS, 1980-1990
(Thousands of Units)

Forecaster	Gross Losses	Non-New Construction Additions	Net Loss
Joint Center (June 1983)	6,068	3,441	2,627
Advance Mortgage (July 1981)			
High	9,000	5,920	3,080
Low	9,000	4,800	4,200
Data Resources (Fall 1981)	7,820	3,500	4,320
John Weicher	6,734	1,222	7,956

SOURCE: See Table 7.

producing a decline in estimated net losses for the decade from 5.0 to 2.5 million units. They could just as well have assumed that losses do not respond as readily to economic changes but rather are determined largely by the initial quality of the housing stock or by the rates of household growth by region. If under baseline economic conditions net losses hold at 2.6 million units, a level consistent with recent trends, the RDA/Rosen/Jaffee estimates of new construction are likely to be high.

The failure to represent net losses explicitly has serious implications. In theory, increases in new construction costs will affect household formation rates as well as inventory losses and non-new construction additions. By failing to model the changing utilization of the existing housing inventory, analyses of the relationship between economic climate and new construction activity are suspect. The changing patterns of losses and non-new construction additions are simply too important to ignore.

Housing in the 1980s: Adapting to a Changing Industry

Forecasts of future housing consumption and investment activity require an understanding of how the existing housing stock adjusts to changing economic conditions. In failing to model losses and non-new construction additions to the inventory, currently available forecasting models provide an inadequate basis for assessing future investment activity, including new construction. Moreover, each of the forecasters surveyed in this paper attempt to model the growth of households by age of household head without explicitly modeling the

family-formation process. Demographic factors other than age are also important determinants of household formation behavior and housing preferences. A more appropriate modeling procedure would be to first forecast families by type (e.g., husband-wife, single parent with children, unrelated individuals), and then model the effects that income, housing prices and other economic variables have on housing market activities.

Existing housing forecast models tend to be highly aggregated. This results from the fact that many of these models are spinoffs of large-scale macroeconomic models of the national economy. Although it is useful to think about housing in the national context, national macroeconomic models typically contain only limited detail about housing markets. Using microsimulation techniques, however, it is possible to construct a model that contains the needed detail. Three types of disaggregation are necessary:

(1) The model must contain sufficient demographic detail to represent the way changes in the composition of families and population influence household formation and housing demand.

(2) The model must include sufficient detail about the housing supply adjustment process to permit assessment of the effect that changing economic conditions have on losses and conversions, as well as on new construction activity.

(3) Since population levels, household characteristics, and housing stock characteristics differ in important respects both across and within regions, a successful forecast model must also be spatially disaggregated. Although some forecasting models present results by

state, there is little reason to believe that these are the proper geographic units to capture the dynamics of local housing markets.

Despite the optimism of the past, the simple fact is that the 1980s will be a period of diminished housing demand and housing construction. Unfortunately, there is inadequate theoretical and empirical information about even the most basic forces governing housing supply and housing demand. This lack of knowledge is no minor academic concern: likely future trends have important implications for consumers, homebuilders, realtors, building material suppliers, financial and governmental institutions.

The 1980s will see new construction activity begin a downward course that will last for the next several decades. With slower growth in the number of households, this does not necessarily imply reduced standards of housing consumption, but it does mean fewer opportunities for those in the homebuilding and housing-related industries. While there will be some countervailing increases in investment in the existing inventory, the housing sector will have to learn to respond more effectively to emerging trends. To meet this challenge, public and private decisionmakers must improve their understanding of how basic demographic, economic, technological, political, and social factors shape housing supply and demand patterns.

NOTES

1. For a review of the earlier housing forecasts, see John Weicher, Lorene Yap, and Mary S. Jones, Metropolitan Housing Needs for the 1980s (Washington, D.C.: The Urban Institute, 1982).
2. For a more detailed discussion of the components of inventory change, see William C. Apgar, Jr., "The Changing Utilization of the Housing Inventory: Past Trends and Future Prospects," MIT-Harvard Joint Center for Urban Studies, Working Paper No. W83-1, revised July 1983.
3. U.S. Bureau of the Census, 1970 Census of Housing: Components of Inventory Change (Washington: U.S. Government Printing Office, 1973).
4. For a more detailed discussion, see George S. Masnick, "The Demographic Factor in Household Formation," MIT-Harvard Joint Center for Urban Studies, Working Paper No. W83-3, revised June 1983.
5. Unless otherwise noted, all references to forecast material are presented in Table 7.
6. For a discussion of methodology, see John Pitkin and George Masnick, "Projections of Housing Consumption in the U.S., 1980 to 2000, By a Cohort Method," Annual Housing Survey Study Series, No. 9 (Washington, D.C.: U.S. Department of Housing and Urban Development, 1980).
7. The Rosen/Jaffee model is now maintained by Regional Data Associates, a subsidiary of Chase Econometrics. This paper discusses forecasts prepared by Kenneth Rosen in May 1982 for the National Association of Home Builders. These forecasts exhibit no substantial differences from those used to prepare the Rosen/Jaffee presentation to the FNMA Symposium in February 1981. For a more recent discussion of the RDA version of the model, see Chase Econometrics, RDA Quarterly Forecast Report, Bala Cynwyd, PA, 1983.
8. For a brief discussion of each of the sectors of the RDA/Rosen/Jaffee model, see Regional Data Associates material entitled "Overview of the Models."