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LAND POLICIES AND THEIR OUTCOMES

Edited by Gregory K. Ingram and Yu-Hung Hong

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Multiple-Home Ownership and the Income Elasticity of Housing Demand

Eric Belsky, Zhu Xiao Di, and Dan McCue

Traditional models of the income elasticity of demand do not account for the possibility that a household may own two or more homes (Hansen, Formby, and Smith 1998). Although estimates of the number of second homes and the share of households that own them vary, it is possible to use existing surveys to narrowly define second-home owners to exclude those who own additional properties purely or mostly for investment reasons and to then separately model the housing choices of owners of one home and of multiple homes (Carliner 2002; U.S. Department of Housing and Urban Development 2004).This topic is of interest because a household that divides its consumption of housing services among two or more properties may make different choices about its primary residence than does a household that owns a single home only. For example, all else being equal, those splitting their consumption among multiple homes may allocate less to their primary homes, and their decisions about the locations of their primary and second homes may have implications for urban form and the operation of land and housing markets.

This chapter examines the determinants of the ownership of multiple homes and the influence of multiple-home ownership on the income elasticity of housing demand. It explores the effect of owning multiple homes on the income elasticity of demand for just primary residences as well as on total housing consumption. To the extent feasible, homes owned for purely investment purposes are excluded from the analysis. Homes that are not used by their owners do not produce a flow of hous-

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ing services. If the intention is not to use such homes, there is little reason to expect ownership to affect the income elasticity of demand for primary residences.

Of course, owning a home always has an investment element because dollars invested in the home have opportunity costs and homes are typically leveraged investments. But the twin consumption and investment motives for home ownership are well established and have not prevented household-level estimation of the income elasticity of housing demand.

Both the American Housing Survey (AHS) and the Survey of Consumer Finances (SCF) are used to model second-home demand, but only the AHS is used to model the income elasticity of demand. A logistic regression is used to analyze the determinants of the demand for multiple-home ownership, while log linear models are used to estimate the income elasticity of demand. We model the effect of the log of estimated permanent income on the log of value of primary homes for owners of single and multiple homes separately after controlling for demographic characteristics, and with or without a dummy variable for investment savings of $20,000 or more. The regression is then repeated to estimate the effect on the log value for the total of all homes owned by households with more than one home. These models test for possible differences in the income elasticity of demand for primary residences subject to the possibility of owning a second home for consumption purposes.

The chapter begins with a literature review on the extent and determinants of second-home demand. Because there are few empirical investigations of second-home ownership, this review is brief. The literature on estimating the income elasticity of housing demand is richer, but much of it focuses on the proper way to measure income for the purposes of estimating the elasticity of demand, as well as other appropriate controls. Our interest is in the effect of second homes. Hence, we also indicate how allowing for multiple-home ownership might influence elasticities, and we advance hypotheses about the likely influences on choices to own second homes. This section is followed by a discussion of data and methods, model findings, and conclusions.

Literature Review

Despite the growing market for second homes, there are few studies of the determinants of demand for second homes or on the propensity of persons to own second homes. Although there are numerous studies on the income elasticity of demand for housing, our review found no studies that examined the effect of second homes on the income elasticity of demand either for primary residences or for all residences owned at least in part for consumption purposes.

PROPENSITIES TO OWN SECOND HOMES

Previous studies of the propensity to own second homes have not used formal probability models to estimate the independent influence of different variables on the odds of owning a second home (see Carliner 1990, 1998, 2002). Using U.S. government data, Di, McArdle, and Masnick (2001) explored the characteristics of the owners of second homes as well as locations, definitions, and measurements of second homes. They found that second homes are owned primarily by middle-aged

white homeowners with high incomes, and that 40 percent of second homes are mobile homes, but they did not look at the wealth of second homeowners.

Looking at wealth, Gutierrez (1999) sought evidence of a wealth effect on the demand for new second homes, but concluded that the data were too unreliable to support definitive conclusions about whether the wealth building and economic prosperity of the late 1990s were associated with increases in second-home development in areas with large second-home shares. Kochera (1997) reported rapid growth in recreational properties in the mid-1990s, but also large numbers of unexplained second homes not used for recreation or investment.

More recently, in a review of data on second-home ownership from the decennial census, AHS, House Vacancy Survey (HVS), and surveys of home buyer preferences from the National Association of Home Builders (NAHB) and National Association of Realtors® (NAR), Carliner (2002) found that second-home ownership is strongly associated with the age of homeowners. He concluded that, although the market still appears to be largely misunderstood, studies indicate that demand for second homes has been holding up and may accelerate somewhat with increases in the income and wealth of homeowners and as more baby boomers enter age cohorts with traditionally higher second-home ownership rates.

In summary, research on the propensity to own a second home has shown descriptively that age, race, and income are associated with second-home ownership and that wealth, though not examined on a household level, has been generally assumed to play a role. No econometric research has studied the determinants of second-home ownership, nor have studies measured income elasticity of housing demand with and without considering second homes.

ESTIMATING DEMAND EQUATIONS

There is a rich body of research on the income elasticity of housing demand. Demand for housing is an embodiment of a consumer's decision about how much housing to consume. Standard theoretical models posit that demand for housing is a function of household income, the price of housing services, and the price of all other goods and services. The standard theoretical equation for the housing equation is a log-linear model:

$$(1) \qquad \log x_i = \beta_0 + \beta_1 \log y + \beta_2 \log p_H + \beta_3 \log p_0 + u$$

In this equation, x_i is the annual real expenditure on housing services, y is income, p_H is the relative price of housing, p_0 is an index of the price of all other goods, and u is a disturbance variable. Using a log form, β_1 is the true income elasticity, and β_2 is the true price elasticity of demand for housing.

THE DEBATE ON CURRENT VERSUS PERMANENT INCOME

When it comes to housing demand models, household income is thought of in two ways: as current income, which is a highly transitory measurement for earnings in a single year, and as permanent income, which is a long-term concept of what household income will be into the future. This concept is shown in equation (2), where Y_i is current income, Y_i^P is the permanent income component of current income, and Y_i^T is the transitory income component of current income:

$$(2) \qquad Y_i = Y_i^P + Y_i^T$$

Housing is a durable good with high transaction costs. It is generally argued that decisions on housing consumption are based on a household's permanent income (Y_i^P) and that, therefore, the transitory income component of a household's current income (Y_i^T) biases demand models that use current income (Y_i) and results in underestimates of demand elasticities.

Carliner (1973) found that demand models attempting to use measurements or proxies for permanent income have achieved significantly higher income elasticities than those using current income. Polinsky and Ellwood (1979) revisited several studies and showed that, when substituted for each other within the same housing demand equation, permanent income elasticities average about 50 percent higher than those for current income. These researchers used metropolitan housing sales price and income data to estimate their own measure of permanent income elasticity and found estimates ranging from 0.80 to 0.87. Since then, Goodman and Kawai (1982) found permanent income elasticities to be 100 percent greater than current income elasticities.

Though it is generally agreed that permanent income is the appropriate measurement for household income within a demand model, there has been much debate on how to correctly estimate permanent income and also on how to treat current income in the process. Reid (1962) approximated permanent income by using a restricted sample of households with stable incomes and by using current incomes as a proxy for permanent incomes. Models by Muth (1965), Winger (1968), and DeLeeuw (1971) used city median incomes as proxies for permanent income, arguing that averaging incomes across metropolitan areas eliminates transitory elements. Other studies, such as that by Carliner (1973), average a household's income of the previous four years to approximate permanent income. More recently, Goodman and Kawai (1982) define permanent income as the predicted value of a regression of current household income on the determinant variables of permanent income, with the residual being transitory income. The resulting equation derived from (2) is as follows:

$$(3) \qquad Y_i = \varphi_0 + \Sigma_j \varphi_j H_j + \Sigma_j \varphi_j N_j + Y_i^T ,$$

where

$$(4) \qquad Y_i^P = \varphi_0 + \Sigma_j \varphi_j H_j + \Sigma_j \varphi_j N_j$$

In (3) and (4), $\Sigma_j \varphi_j H_j$ is the sum of a vector of human capital components of permanent income and their respective coefficients (age, education, employment status), and $\Sigma_j \varphi_j N_j$ is a sum of a vector of nonhuman capital components of permanent income. To determine permanent income, our model follows the methodology of Wachter and Megbolugbe (1992) in performing a Box-Cox transformation on the dependent variable of the permanent income regression with $\lambda = 0.5$, and then retransforms the predicted value before including it in the demand model (see appendix 1 for model results).

INCORPORATING DEMOGRAPHIC AND OTHER HOUSEHOLD CHARACTERISTICS

Housing demand models have grown to include a number of demographic variables in attempts to measure differing tastes for housing consumption among a cross section of households with differing characteristics (Goodman 1990; Hansen, Formby, and Smith 1998). There has been much disagreement about the significance of demographic factors in demand models. In their review of several studies, Hansen, Formby, and Smith (1998) suggest that exclusion of demographic variables likely to be correlated with permanent income—such as race, age, gender, and household size—will bias estimations of income elasticity, and that the direction of this bias is most likely upward. However, an earlier empirical study by Carliner (1973) found that income elasticity measurements from regressions using demographic terms are higher than those without. Another empirical study by Follain (1979) found that income and price elasticities were not sensitive to the presence of sociodemographic variables, and a third empirical study by Goodman (1990) found demographic interactions to be relatively insignificant for populations close to general population means but highly significant for populations away from means, such as those at very low or very high incomes. In light of this diverse array of findings, we felt it necessary to include demographic variables in our model. Age, race, and family type are the most appropriate factors available in our data set.

CONTROLLING FOR HOUSE-PRICE AND NONHOUSING COST INDEXES

The standard demand model in equation (1) generates price and income elasticities of housing demand based on the utility of housing consumption relative to all other goods. Goodman and Kawai (1984), following DeLeeuw (1971) and Polinsky and Ellwood (1979), estimate a demand model with demographic and housing characteristic variables but without a nonhousing cost index, choosing instead to apply various fixed-effect coefficients within the ordinary linear regression.

Due to limited geographic data in the AHS data set, our model uses this fixed-effect approach to control for relative differences in both house-price and nonhousing costs based on regional location as well as metropolitan and nonmetropolitan location.

Our fixed-effect estimated regression equation becomes:

$$(5) \qquad \log (h_i) + \beta_0 + \beta_1 \log y_i^P + \Sigma_j \varphi_j Z_{ji} + u,$$

where h_i is the value of housing consumption and Z_{ji} is a vector of our 12 geographic dummies to control for the relative price of housing and nonhousing goods to the individual as well as demographic and other housing characteristic dummy variables that potentially affect the demand for housing and to control for fixed effects on housing consumption within the model.

We use housing value as our measure of housing consumption (h_i). Researchers generally agree that housing consumption for homeowners is best approximated and more easily obtained as a standardized measurement of total housing value rather than as annual expenditures on home ownership. The common method, used by Goodman and Kawai (1984), involves hedonic regression, whereby a household's housing value is taken as a function of neighborhood and resident charac-

teristics. The housing price index can be determined by the price of a standardized unit of housing according to the hedonic regression, and housing consumption can then be measured as housing value divided by the price of a standardized unit. Including geographic and socioeconomic characteristics within our fixed-effects model enables us to somewhat standardize housing value in the demand model, though using separate hedonic regressions would clearly be superior. Therefore, h_i is approximated simply as the total value of housing.

CONTROLLING FOR OTHER EFFECTS: WEALTH AND ELDERLY STATUS

Wealth variables seem not to have been included in previous studies, although they may affect the propensity of second-home ownership and influence income elasticity estimates. Although age has often been included in studies of income elasticity, its effect may not be linear, and its interaction with income is possible. The lack of these variables in previous studies encourages us to include them in our study.

Measures and Magnitude of Second-Home Demand

This chapter is not intended to reopen debates about the level of income elasticity of housing demand. Instead, it explores whether ownership of second homes influences the income elasticity of demand for primary residences or for the aggregate value of all homes that are owned, at least in part, for consumption. This is increasingly relevant given the apparent increase in second-home ownership in recent years.

Statistics on the extent of second-home ownership and the number of second homes are often inconsistent. The inconsistencies mostly reflect differences in methods of data collection, especially in the wording of questions about the purpose of vacant or additional owned properties, but also as a result of differences in sample sizes, sampling procedures, and weighting procedures across surveys.

The AHS, HVS, and decennial census contain estimates of the number of second homes based on interviewer efforts to determine the status of vacant units. The estimates by the AHS and the HVS, which define second homes as homes for seasonal or occasional use and homes occupied by people with a usual residence elsewhere, are closer to each other than they are to the decennial census, which consistently estimates a far smaller number of second homes. The AHS produced higher estimates than the HVS in the early to mid-1990s and lower estimates thereafter (Carliner 2002). The HVS registered over 20 percent increase in the number of second homes from 5.6 million in 1995 to 6.8 million in 2005, while the AHS reported a smaller but still substantial increase from 5.8 million in 1995 to 6.2 million in 2003.

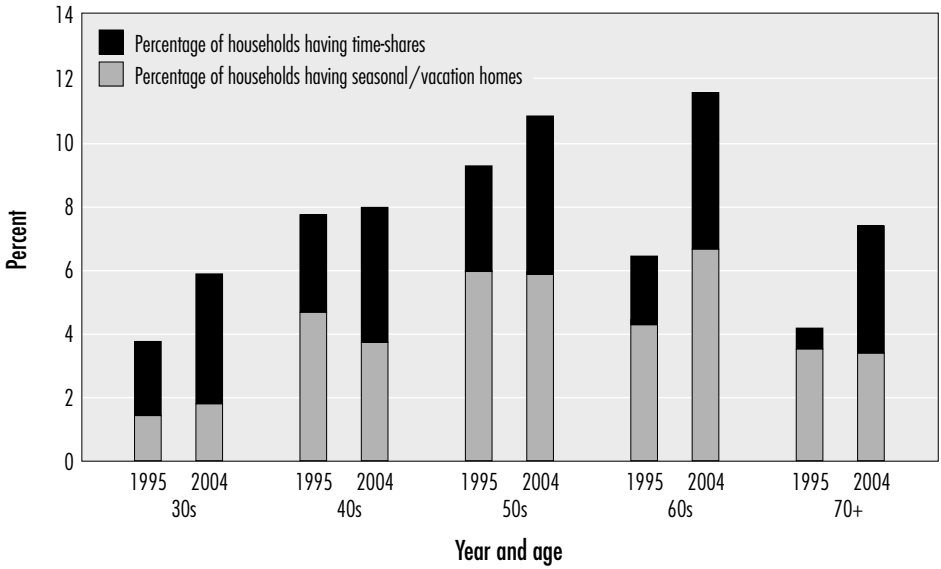
Many surveys ask households whether they own additional properties and then ask questions about these properties. These include the AHS, the SCF, the Survey of Income and Program Participation (SIPP), the Panel Study of Income Dynamics (PSID), and industry surveys such as one of new home buyers conducted by the National Association of Home Builders (2000) and of home buyers and homeowners by the National Association of Realtors®. A 2005 NAR survey of home buyers found that about 12 percent of all homes purchased were characterized as being for vacation use and 28 percent for investment purposes (National

Association of Realtors, 2005). The intricacies of how the household surveys are conducted are well summarized by Carliner (2002) and the U.S. Department of Housing and Urban Development (2004).

The SCF is the only data set to ask questions about second homes on a regular basis (every three years). Like the HVS, it shows growth in second-home demand over the past decade (figure 14.1). However, for all age groups except people now in their 60s, the growth was in time-share fractional ownership in second homes. Overall, the SCF shows an increase of about 600,000 homes for seasonal/vacation use and in time-shares of fully 1.8 million. Assuming that fractional ownership averages two weeks per year, a 1.8 million increase in time-share owners translates into only about 70,000 units.

Although the figures suggest that second-home ownership rates peak at about 6 to 6.5 percent among homeowners in their 50s and 60s and that rates of time-shares peak at about 5 percent, these may be undercounts. When SCF respondents are asked what type of property they own, they must choose from "seasonal/vacation home," "time-share ownership," and a host of structure types including single-family house, condominium, residential, trailer/mobile home, and farm/ranch, among others. It is likely that some of those who own homes for occasional use on weekends or for work do not consider them as being for seasonal or vacation use. Indeed, many of those responding with a structure type do not derive rental income from their second homes, suggesting that some are at least in part for consumption uses.

Figure 14.1
Second-Home Ownership Has Increased Across All Ages



Source: Calculated from SCF data.

An even greater number of households will be headed by younger baby boomers in the 50 to 59 age group by 2015 than are today headed by baby boomers currently in that age range, and each generation accumulates more household net wealth and higher median incomes than previous generations at similar ages. As a result, demand for second homes is likely to continue to grow in the coming decade (Belsky and Prakken 2004).

Hypotheses

The literature and economic theory suggest the following hypotheses with respect to the likelihood of owning a second home and the effect of owning a second home on income elasticities for housing.

1. *The likelihood of owning a second home will be increasing with permanent income, current income, wealth, and age.* Higher incomes and wealth allow consumers to allocate more of the household budget to housing consumption and investment. Life-cycle factors suggest that even after controlling for income and wealth, second-home ownership might be higher for older households as homeowners approach or reach retirement and have more leisure time. But the effect of the presence of children is more ambiguous; on one hand, having children may increase the utility of a second home, but on the other hand, children may be a drain on the household budget.

   Geographic location of the primary residence might also have an influence, but is also ambiguous. With most owners having second homes within driving distance of their primary residences, living in a lower cost area could increase the likelihood of owning a second home because the costs of buying a second home are lower. On the other hand, these same areas tend to have lower price appreciation and therefore leave owners with less housing wealth to leverage for second-home ownership.
2. *The income elasticity of demand for primary residences will be lower for people with second homes than for those with just one home.* Several factors lead to this expectation. First, households that have a preference for owning second homes divide their housing consumption among more than one property, and one would expect the income elasticity of demand for just their primary homes to be lower than for owners of only one home. This holds true whether the initial decision on how much to spend on a primary residence was made with the intention of buying a second home or if, instead, over the life cycle, a homeowner decides to adjust housing consumption upward by investing in a second home rather than trading up to a higher valued home or improving the primary residence.

   Second, second-home owners have higher average incomes and housing consumption levels relative to owners of just one home; their average income is very close to that of owners in the upper income quartiles of a single residence. Therefore, second-home owners may be closer to being fully housed. In this case, uses of an incremental dollar other than on housing may maximize overall utility. As a result, income increases may not lead to a large percentage change in consumption in their primary (or secondary) homes.

Last, owners of a single home with no desire for second-home ownership may have more of an incentive to maximize the quality and consumption value of their sole home, while those with a propensity to own second homes may underconsume their primary house in favor of second-home ownership.

3. *The income elasticity of demand with respect to all houses owned by second-home owners will be lower than the elasticity of just their primary property.* With consumption split, spending on the primary home will take precedence over spending on the secondary home, and lower elasticities of secondary home demand will drag down overall elasticities of demand that incorporate both primary and secondary home consumption. Given the same income distribution, the income elasticity of demand for the primary home (*eP*) relates to the elasticity of the second home (*eS*) as a ratio based on the way in which consumption of these two goods relate to each other, based on the formula[1]

(6) $eS = eP$ (% Change of S / % Change of P).

With this equation, if both primary and secondary consumption are treated equally, the two income elasticities are equal. But we posit that consumption of the primary home is the first priority because that is where homeowners spend more of their time. Therefore an incremental dollar will contribute more to consumption of a primary home than of a second home. Thus, *eS* is less than *eP*. So it follows that the elasticity of total housing consumption should be higher than the elasticity for the second home, but lower than for primary home consumption. This should be true for the nonelderly, at least, but seniors may spend half or even more time in their second homes.

4. *The income elasticity of demand with respect to all properties owned by people who have second homes for consumption purposes will be lower than that of single-home owners*. This is because, similar to the reasoning in 2 above, second-home owners on average are older and already have high levels of wealth and income and high levels of housing consumption, so they are less likely to be underhoused than the generally lower-income owners of a single home. Therefore, income increases are not matched by the same increases in housing consumption seen by the generally lower-income owners of a single home. This may be tested and seen through decreasing elasticities of demand among single-home owners as income levels increase.

5. *Models that do not include the value of second homes and do not control for second-home ownership are likely to produce biased estimates of the income elasticity of housing demand*. This is because the ownership of multiple homes is expected to influence the income elasticities of demand in the ways stipulated in 1 through 4 above.

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1. With income Y, the primary elasticity is $eP = (dP/P) / (dY/Y)$ and the second is $eS = (dS/S) / (dY/Y)$. Solving for Y in the former equation, we obtain $Y = (eP^*P^*dY)/dP$, and substituting this into the latter equation, we have $eS = eP^* (dS/S)/(dP/P)$, which can be rewritten as $eS = eP^*$ [(% Change of S) / (% Change of P)].

Data and Method

We use the AHS and SCF to provide empirical evidence on determinants of second-home ownership and the AHS to explore income elasticity of housing demand when second-home ownership is considered. The AHS is conducted by census for HUD every two years at the national level; only in 1985 and 1995 did it have a supplemental survey on second homes. In these two years, respondents were asked about other residential properties they owned in addition to their primary homes, and up to six such properties were surveyed. For each recorded property, respondents were asked to mark all the reasons why they held that property. Only properties that are marked for recreational use are included in order to narrow the analysis to second homes that provide a flow of housing consumption services.

The regular AHS survey contains detailed household information, including current household income, age, race/ethnicity, education level of household heads, and family type. Unfortunately, geographic detail is lacking in the data set. While about 100 metropolitan areas are specified, the number of observations is far too few in most cases to create a meaningful hedonic price index. Instead, to control for differences in the costs of housing and nonhousing goods across areas, we rely on the interaction of the four census regions and three types of metropolitan status (cities, suburbs, and nonmetropolitan). This provides 12 variations—an admittedly crude control for housing price differences across the country.

The AHS also has a dummy variable on whether the household has investment savings of $20,000 or more. This is a crude proxy for the level of nonhousing wealth. It could affect the income elasticity of housing demand, but current literature overlooks the potential effects of wealth on income elasticity. Particularly for the propensity of second-home ownership, nonhousing wealth may have some influence as a determinant.

Table 14.1 shows basic descriptive statistics on the AHS variables used to model propensities and elasticities. Because AHS top codes the value of primary homes at $375,000, we drop these cases, which make up roughly 3 percent of all cases, in our elasticity models to avoid using exactly the same value for all records with house values at the top code. The second-home value is not top coded, so models of the total value of properties owned by people who own a home under $375,000 in 1995 are not right-censored on second-home value. We also exclude a couple of hundred cases (less than 1 percent of the entire sample) in our elasticity models involving owners of multiple homes where no information on the value of second homes was provided.

The SCF is conducted by the Federal Reserve Bank every three years. The 2004 survey was released in March 2006. The survey was originally designed to measure all kinds of debt that people take on, so it has very rich information on liabilities versus assets and therefore the net wealth of each household surveyed. Because of the imbalances in wealth holding and distribution, the SCF oversamples wealthy households. Roughly half of its sample is a set of wealthy households, and the other half is made up of households distributed across a greater spectrum of household wealth. As a result, a weighted sample is used.

One benefit of this sampling procedure is that it ensures better accuracy at the level of aggregate household net wealth. Therefore, an advantage of using the SCF

Table 14.1
Descriptive Statistics (American Housing Survey data)

Variables	Sample Group: All Homeowners					
	Unweighted N					
	Yes	%	No	%	Mean	SD
Less than high school	5,140	17.5	24,244	82.5		
High school	9,146	31.1	20,238	68.9		
Some college	7,333	25.0	22,051	75.0		
College plus	7,765	26.4	21,619	73.6		
Minority status	4,767	16.2	24,617	83.8		
Under 35	4,059	13.8	25,325	86.2		
35–44	6,768	23.0	22,616	77.0		
45–54	6,189	21.1	23,195	78.9		
55–64	4,494	15.3	24,890	84.7		
65+	7,874	26.8	21,510	73.2		
Married couple without kids	10,759	36.6	18,625	63.4		
Married couple with kids	8,212	27.9	21,172	72.1		
Single parent	1,537	5.2	27,847	94.8		
Other family household	2,415	8.2	26,969	91.8		
Single person household	5,550	18.9	23,834	81.1		
Other nonfamily household	911	3.1	28,473	96.9		
New England city	2,961	10.1	26,423	89.9		
New England suburb	1,617	5.5	27,767	94.5		
New England nonmetropolitan	1,990	6.8	27,394	93.2		
Midwest city	4,057	13.8	25,327	86.2		
Midwest suburb	2,464	8.4	26,920	91.6		
Midwest nonmetropolitan	2,069	7.0	27,315	93.0		
South city	3,520	12.0	25,864	88.0		
South suburb	3,729	12.7	25,655	87.3		
South nonmetropolitan	1,819	6.2	27,565	93.8		
West city	2,735	9.3	26,649	90.7		
West suburb	1,151	3.9	28,233	96.1		
West nonmetropolitan	1,256	4.3	28,128	95.7		
Total value of all homes					117,520	90,148
Value of primary home					115,092	84,158
Current household income					48,741	38,091
Having investment savings of more than 20K	1,256	4.3	28,128	95.7		
Having recreational second homes	972	3.3	28,412	96.7		

data to model the probability of owning a second home is that SCF data provide the most accurate and detailed wealth information of any household survey. With these data, we are able to obtain nonhousing wealth as a variable that omits home equity, which is too closely correlated to our dependant variable of home value and would induce bias. This is more precise than the AHS dummy indicator of savings in excess of $20,000.

The biggest limitation of the SCF data is its small sample size of fewer than 5,000 households. The file released for public use does not have geographic variables, which prevents us from controlling for house price variation across regions or metropolitan status. It also prevents meaningful estimation of permanent income. For this reason, SCF data are only used to model the propensity of owning a second home.

The SCF also has intrinsic problems embedded in the questionnaire design. As noted above, because of the coding system, some households may have chosen structure-type categories such as single-family or multifamily units even though their homes are for their own seasonal or occasional use. Table 14.2 displays descriptive statistics of homeowners in the SCF data. Because we run models on weighted samples, both unweighted and weighted statistics are displayed.

The two different data sets have different estimates on the share of vacation home owners among all households. The 2004 SCF data indicate a 3.7 percent vacation-home ownership rate, while the 1995 AHS data show a 3.3 percent rate. This is not surprising when considering the growth of vacation homes during the decade and differences in the questions about the purpose of second properties. In both sets of data, we exclude time-share units from the count of recreational second homes.

With the compelling theoretical and empirical arguments for using permanent income rather than current income as the appropriate correlate to estimate income elasticity, our preferred AHS models use the Box-Cox square root transformation in a two-step method, first estimating household permanent income as described in appendix 1, and then plugging predicted values into the propensity and income elasticity of demand regressions. We do not estimate permanent income in SCF data because the data lack a geographic information control for regional wage differentials. Thus, our models employing AHS data use permanent income, while our propensity model based on SCF data uses both current household income and the education level of household heads, which is often a proxy indicator for permanent income.

In our elasticity models, we run nonelderly and elderly samples separately, because we suspect that they may have statistically significant differences in elasticity with respect to permanent income, especially since our predicted values for permanent income are apt to have larger residual errors for older people because the correlation of current incomes and the right-hand side predictors are weaker for retirees. We also run models with and without the wealth variable to see how it affects other coefficients, especially income elasticities.

In model 1 we estimate the elasticity among people who own only a single home, using the value of primary home as the dependent variable. In model 2 we estimate the elasticity of demand for just the primary residence among those who own more than one home, again using the value of the primary home as the dependent variable. This is our principal test of the hypothesis that the income elasticity of demand for primary residences will be lower for second-home owners than for others because the second-home owners split their consumption among multiple properties.

In model 3 we estimate the income elasticity of demand using the total value of all homes owned by second-home owners as the dependent variable to test the

Table 14.2
Descriptive Statistics (Survey Consumer Finances data)

Variables	Sample Group: All Homeowners											
	Unweighted N						Weighted N					
	Yes	%	No	%	Mean	SD	Yes	%	No	%	Mean	SD
Less than high school education	1,418	8.6	14,977	91.4			10,084,611	13.0	67,329,712	87.0		
High school education	3,349	20.4	13,046	79.6			21,595,072	27.9	55,819,252	72.1		
Some college	2,870	17.5	13,525	82.5			17,012,350	22.0	60,401,974	78.0		
College graduate and higher	8,758	53.4	7,637	46.6			28,722,291	37.1	48,692,033	62.9		
Minority status	2,397	14.6	13,998	85.4			14,894,182	19.2	62,520,141	80.8		
Age under 35	1,401	8.5	14,994	91.5			10,341,166	13.4	67,073,158	86.6		
Age 35–44	2,905	17.7	13,490	82.3			15,783,863	20.4	61,630,461	79.6		
Age 45–54	4,250	25.9	12,145	74.1			17,988,831	23.2	59,425,493	76.8		
Age 55–64	3,983	24.3	12,412	75.7			13,517,649	17.5	63,896,675	82.5		
Age 65+	3,856	23.5	12,539	76.5			19,782,815	25.6	57,631,508	74.4		
Married couples	11,755	71.7	4,640	28.3			47,580,287	61.5	29,834,037	38.5		
Male-headed households	2,265	13.8	14,130	86.2			12,963,143	16.7	64,451,181	83.3		
Female-headed households	2,375	14.5	14,020	85.5			16,870,894	21.8	60,543,429	78.2		
Total value of all homes					1,187,458	3,112,890					263,594	456,240
Value of primary home					870,106	1,882,222					246,807	359,768
Current household income					1,061,331	4,499,026					87,069	250,929
Household nonhousing wealth					12,259,998	46,399,527					462,304	
Have vacation home	2,323	14.2	14,072	85.8			2,885,714	3.7	74,528,610	96.3		

hypothesis that elasticity will be lower because a percentage point increase in income will bring about a smaller percentage point increase in the larger combined first- and second-home total value. In model 4 we estimate the income elasticity of demand just for second homes among second-home owners to test the hypothesis that elasticity will be lower than the primary-home demand elasticities, indicating relatively low income elasticities for second-home demand, preference for primary-home consumption, and, most important, the negative influence of second-home ownership on demand elasticities for total housing consumption. In model 5 we present a single model of housing value for all homeowners with a dummy variable indicating ownership of a second home. This is included to provide an unbiased estimate of the income elasticity of housing demand that incorporates the possibility of second-home ownership.

Finally, we perform a secondary test of the hypothesis that, because second-home owners have higher average incomes than the general population of homeowners with just one home, second-home owners have lower elasticities of demand for primary residences. We divide the owners of one home into income quartiles to see if the income elasticity of demand is in fact lower among owners with average incomes similar to the population of second-home owners.

Our data do not include geographic controls for second-home location. Since our models proxy housing consumption with house value, uncontrolled-for location-based differences in appreciation levels of second homes may bias measurements of income elasticities based on current second-home values. Although most second homes are within driving distance of first homes and may have similar rates of appreciation, if a significant number of second homes bought at the same price point had significantly different appreciation rates, the current value will not equally reflect total home consumption. In the end, we assume that second-home location and appreciation rates have some effect on income elasticities and owners' adjustments to housing consumption that lie beyond the scope of this chapter.

The functional form of our propensities models is logistic and that of our elasticity models is log-linear. Hence, the variables in propensities infer differences in the odds of owning a second home conditional on each individual variable holding the others constant. The coefficients on income in the log-linear models can be interpreted as the elasticity of housing demand with respect to income and assume constant elasticities across all values of the independent variables.

More formally, our logistic model takes the following form:

$$(7) \qquad P(S_i) = \varphi_0 + \varphi_1 Y_i^P + \varphi_2 MINORITY_i + \Sigma\psi_j AGE_{ji} + \Sigma\tau_k FAMILY_{ki} + \Sigma\omega_l GEOGRAPHY_{li} + \varphi_3 ELDERINCOME_i + U_i,$$

where $P(S_i)$ is the probability of owning a second home, Y_i^P is permanent income, *MINORITY* is a dummy variable indicating whether the household head is non-Hispanic white (1 if minority, and 0 otherwise); AGE_j is 4 dummy variables flagging 10-year age cohorts (35–44 years old, 45–54 years old, 55–64 years old, and 65+ years old, with under 35 as the reference group); $FAMILY_k$ is 5 dummy variables flagging the type of family (married with children, single parents, other family type,

single person, and other nonfamily type, with married without children as the reference group); $GEOGRAPHY_i$ is 11 dummy variables controlling for regional and metropolitan level fixed effects (Northeast suburb, Northeast nonmetropolitan, Midwest city, Midwest suburb, Midwest nonmetropolitan, South city, South suburb, South nonmetropolitan, West city, West suburb, and West nonmetropolitan, with Northeast city as the reference group), and U_i is a disturbance variable. In our propensity model using AHS data, we also include an interaction variable *ELDERINCOME* containing the income of elderly people, assuming their incomes may have a different effect on second-home ownership.

Table 14.3a
Propensity Model for Vacation Home Ownership (American Housing Survey data)

Dependent Variable: Owning a Recreational Home Sample Group: All Homeowners		
Variable	**Coefficients**	**Odds Ratio**
Intercept	–5.7521	
Permanent income (in $10,000s)	0.2671***	1.306
Having savings and investments over $20K	0.3951**	1.484
Minority	–0.3973**	0.672
Age 35–44	0.8688***	2.384
Age 45–54	1.3011***	3.673
Age 55–64	1.8718***	6.5
Age 65+ (elderly)	1.0153***	2.76
Married with children	–0.1936~	0.824
Single parents	–0.3904	0.677
Other family type	–0.8844***	0.413
Single person	–0.0958	0.909
Other nonfamily type	–0.3631	0.696
New England suburb	–0.1537	0.857
New England nonmetropolitan	0.0987	1.104
Midwest city	–0.0982	0.906
Midwest suburb	–0.0414	0.959
Midwest nonmetropolitan	–0.1117	0.894
South city	–0.0297	0.971
South suburb	–0.1107	0.895
South nonmetropolitan	–0.2279	0.796
West city	–0.1410	0.869
West suburb	–0.0602	0.942
West nonmetropolitan	–0.2206	0.802
Permanent income (in $10,000s) elderly	0.2660***	1.305

~ = p <.10
* = p <.05
** = p <.01
*** = p <.001

Our elasticity models take the following form:

$$(8) \qquad \log(h_i) = \beta_0 + \beta_1 \log y_i^P + \beta_2 SAVINGSOVER20K + \beta_3 MINORITY_i + \Sigma\tau_k FAMILY_{ki} + \Sigma\omega_l GEOGRAPHY_{li} + U_i,$$

where h_i is the value of the primary home or the total value of all homes; y_i^P is the predicted permanent income; w_i is a dummy variable flagging household savings and investments of over $20,000 (1 if yes, and 0 otherwise); *MINORITY* is a dummy variable indicating whether the household head is non-Hispanic white; $FAMILY_k$ is 5 dummy variables flagging the type of family (married with children, single parents, other family type, single person, and other nonfamily type); $GEOGRAPHY_l$ is 11 dummy variables controlling for regional and metropolitan-level fixed effects (Northeast suburb, Northeast nonmetropolitan, Midwest city, Midwest suburb, Midwest nonmetropolitan, South city, South suburb, South nonmetropolitan, West city, West suburb, and West nonmetropolitan); and U_i is a disturbance variable.

Findings from the Propensity Models

Tables 14.3a and 14.3b show our propensity models in AHS and SCF data. The patterns observed in two different data sets collected nine years apart seem amazingly

Table 14.3b
Propensity Model for Vacation Home Ownership (Survey Consumer Finances data)

Dependent Variable: Owning a Vacation Home Sample Group: All Homeowners		
Variable	**Coefficients**	**Odds Ratio**
Intercept	–6.0876	
Household income (in $10,000s)	0.0050*	1.005
Nonhousing wealth (in $10,000s)	0.0009***	1.001
High school education	0.3881	1.474
Some college	1.1650~	3.206
College graduate and higher	1.4906*	4.44
Minority status	–0.9540*	0.385
Age 35–44	1.3422~	3.827
Age 45–54	2.2785**	9.762
Age 55–64	2.4220**	11.268
Age 65+ (elderly)	2.1596**	8.667
Male-headed households	–0.5896~	0.555
Female-headed households	–1.5790***	0.206
Household income (in $10,000s) elderly	0.0030	1.003

~ = p <.10
* = p <.05
** = p <.01
*** = p <.001

Table 14.4a
Elasticity Model Using Predicted Permanent Income and Wealth Variables (nonelderly)

	Sample Group: Nonelderly Homeowners				
	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent Variable:	Value of Primary Home	Value of Primary Home	Total Value of All Homes	Value of Vacation Home(s)	Value of All Homes
Sample Subgroup:	Do Not Own a Vacation Home	Own a Vacation Home	Own a Vacation Home	Own a Vacation Home	All Nonelderly Homeowners
Intercept	–1.6110	0.9363	3.1226	3.1082	–1.5382
Predicted permanent income (in $10,000s)	1.1814***	0.9741***	0.8343***	0.7237**	1.1750***
Having savings and investments over $20K	0.0341	–0.2720~	–0.3273*	–0.3932	0.0206
Minority	0.0213	0.1925~	0.0784	0.0489	0.0218
Age 35–44	0.0147	–0.1388	–0.1127	–0.1530	0.0145
Age 45–54	0.0452**	–0.1167	–0.0914	–0.1143	0.0442**
Age 55–64	0.2843***	0.1052	0.0091	–0.1894	0.2805***
Married with kids	0.0719***	0.1220	0.0567	–0.0756	0.0724***
Single parents	0.3478***	0.3153	0.2272	0.1944	0.3454***
Other family type	0.0539*	–0.0223	0.1098	0.3299	0.0551*

Single person	0.3302***	0.2166	0.3546**	0.5761**	0.3317***
Other nonfamily type	–0.0337	–0.0802	–0.0525	0.1189	–0.0331
New England suburb	0.2006***	0.1257	0.0116	0.1789	0.1945***
New England nonmetropolitan	0.1056**	0.3636~	0.3665**	0.7736**	0.1099**
Midwest city	–0.1737***	0.1363	–0.0355	0.0347	–0.1732***
Midwest suburb	0.0029	0.0122	–0.1514	–0.0911	–0.0023
Midwest nonmetropolitan	–0.1586***	–0.0776	–0.2995*	–0.3196	–0.1631***
South city	–0.0479	–0.0986	–0.2755	–0.1047	–0.0532
South suburb	–0.0263	0.0576	–0.1005	0.0630	–0.0286
South nonmetropolitan	–0.2027***	0.0411	–0.1694	–0.1764	–0.2032***
West city	0.3884***	0.3840*	0.2318	0.1494	0.3843***
West suburb	0.3738***	0.3752*	0.4075**	0.5040~	0.3740***
West nonmetropolitan	0.1520***	–0.1161	–0.2153	–0.0615	0.1426***
Own a vacation home					0.6946***
R-squared	0.2354	0.2301	0.2630	0.1287	0.2509

~ = p <.10
* = p <.05
** = p <.01
*** = p <.001

Table 14.4b
Elasticity Model Using Predicted Permanent Income and Wealth Variables (elderly)

Sample Group: Elderly Homeowners					
Dependent Variable:	**Model 1** Value of Primary Home	**Model 2** Value of Primary Home	**Model 3** Total Value of All Homes	**Model 4** Value of Vacation Home(s)	**Model 5** Value of All Homes
Sample Subgroup:	**Do Not Own a Vacation Home**	**Own a Vacation Home**	**Own a Vacation Home**	**Own a Vacation Home**	**All Elderly Homeowners**
Intercept	4.3833	6.2127	6.8609	5.8369	4.4123
Predicted permanent income (in $10,000s)	0.6643***	0.5208**	0.5230**	0.5408~	0.6618***
Savings and investments over $20K	0.0749**	–0.3180*	–0.3630*	–0.5054~	0.0680**
Minority	–0.0451	–0.2572	–0.1809	–0.2659	–0.0484
Married with kids	0.0458	1.3486*	1.5085*	1.9337~	0.0798
Single parents	–0.2238	NA	NA	NA	–0.2267
Other family type	0.0317	0.3511	0.2368	–0.0058	0.0326
Single person	0.2980***	0.2246	0.4152*	0.8192*	0.2976***
Other nonfamily type	–0.0305	–0.1464	–0.1108	0.2406	–0.0306

New England suburb	0.2538***	0.1125	–0.1024	–0.5305	0.2471***
New England nonmetropolitan	0.0584	–0.1768	–0.1438	–0.1841	–0.1438
Midwest city	–0.1281**	–0.2419	–0.4009	–0.6424	–0.1297**
Midwest suburb	0.0023	–0.2337	–0.4886~	–0.9928~	–0.0053
Midwest nonmetropolitan	–0.0938~	–0.4499	–0.7384*	–1.1928*	–0.1013**
South city	0.02576	–0.11892	–0.28319	–0.58427	0.024
South suburb	–0.08877~	0.04567	0.04439	0.01921	–0.0835**
South nonmetropolitan	–0.15649**	0.03585	–0.39357	–1.79853**	–0.15873***
West city	0.45768***	0.2668	–0.01365	–0.42189	0.45***
West suburb	0.33943***	0.29476	–0.01042	–0.68952	0.33476***
West nonmetropolitan	0.20072***	0.19681	–0.07404	–0.68283	0.19816***
Own a vacation home					0.67716***
R-squared	0.1799	0.2798	0.2650	0.2066	0.1990

~ = p <.10
* = p <.05
** = p <.01
*** = p <.001
NA = Not applicable.

Table 14.4c
Elasticity Model Using Predicted Permanent Income, No Wealth Control Variable (same as Model 4a but without savings and investments over $20K)

	Sample Group: Nonelderly Homeowners				
	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent Variable:	Value of Primary Home	Value of Primary Home	Total Value of All Homes	Value of Vacation Home(s)	Value of All Homes
Sample Subgroup:	Do Not Own a Vacation Home	Own a Vacation Home	Own a Vacation Home	Own a Vacation Home	All Nonelderly Homeowners
Intercept	–1.6109	0.7233	3.0282	2.8045	–1.5378
Predicted permanent income (in $10,000s)	1.1814***	0.9941***	0.8438***	0.7523**	1.1749***
Minority	0.0208	0.1923~	0.0766	0.0485	0.0215
Age 35–44	0.0148	–0.1417	–0.1231	–0.1574	0.0146
Age 45–54	0.0456**	–0.1288	–0.1017	–0.1317	0.0444**
Age 55–64	0.2858***	0.1039	0.0074	–0.1912	0.2814***
Married with kids	0.0720***	0.1252	0.0572	–0.0711	0.0724***
Single parents	0.3481***	0.3067	0.2129	0.1818	0.3456***
Other family type	0.0539*	–0.0068	0.1261	0.3523	0.0550*
Single person	0.3312***	0.2157	0.3468**	0.5745**	0.3323***

Other nonfamily type	–0.0330	–0.0968	–0.0763	0.0948	–0.0327
New England suburb	0.2004***	0.1221	0.0094	0.1738	0.1944***
New England nonmetropolitan	0.1057**	0.3322~	0.3285~	0.7283*	0.1100**
Midwest city	–0.1738***	0.1166	–0.0582	0.0063	–0.1732***
Midwest suburb	0.0028	0.0066	–0.1737	–0.0995	–0.0023
Midwest nonmetropolitan	–0.1584***	–0.0901	–0.3158~	–0.3378	–0.1630***
South city	–0.0478	–0.1098	–0.2915~	–0.1209	–0.0531
South suburb	–0.0263	0.0509	–0.1092	0.0534	–0.0286
South nonmetropolitan	–0.2026***	0.0377	–0.1757	–0.1814	–0.2032***
West city	0.3886***	0.3682~	0.2135	0.1266	0.3845***
West suburb	0.3739***	0.3671*	0.3993*	0.4923~	0.3741***
West nonmetropolitan	0.1527***	–0.1769	–0.2893	–0.1494	0.1431***
Own a vacation home					0.6949***
R-squared	0.2354	0.2250	0.2508	0.1238	0.2509

~ = p <.10
* = p <.05
** = p <.01
*** = p <.001

Table 14.4d
Elasticity Model Using Predicted Permanent Income, No Wealth Control Variable (same as Model 4b but without savings and investments over $20K)

Sample Group: Elderly Homeowners					
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Dependent Variable:	**Value of Primary Home**	**Value of Primary Home**	**Total Value of All Homes**	**Value of Vacation Home(s)**	**Value of All Homes**
Sample Subgroup:	**Do Not Own a Vacation Home**	**Own a Vacation Home**	**Own a Vacation Home**	**Own a Vacation Home**	**All Elderly Homeowners**
Intercept	4.3661	5.8300	6.4240	5.2286	4.3983
Predicted permanent income (in $10,000s)	0.6663***	0.5519**	0.5586**	0.5904~	0.6635***
Minority	–0.0490	–0.1962	–0.1112	–0.1688	–0.0521~
Married with kids	0.0400	1.3571*	1.5182*	1.9472~	0.0744
Single parents	–0.2265	NA	NA	NA	–0.2292
Other family type	0.0299	0.3317	0.2146	–0.0367	0.1597
Single person	0.3037***	0.1535	0.3340~	0.7062*	0.3029***
Other nonfamily type	–0.0262	–0.1344	–0.0970	0.2597	–0.0267

New England suburb	0.2577***	0.1136	–0.1011	–0.5286	0.2507***
New England nonmetropolitan	0.0623	–0.1441	–0.1065	–0.1321	0.0606
Midwest city	–0.1228*	–0.2140	–0.3691	–0.5981	–0.1249*
Midwest suburb	0.0066	–0.1814	–0.4290	–0.9098	–0.0017
Midwest nonmetropolitan	–0.0852	–0.3940	–0.6746*	–1.1039~	–0.0938~
South city	0.02862	–0.05629	–0.21169	–0.48473	0.02645
South suburb	–0.08564~	0.06143	0.06238	0.04425	–0.08075~
South nonmetropolitan	–0.15423**	0.10301	–0.3169	–1.69179**	–0.15685**
West city	0.46045***	0.29434	0.01778	–0.37813	0.45241***
West suburb	0.34438***	0.30352	–0.000414	–0.67559	0.3393***
West nonmetropolitan	0.20717***	0.25103	–0.01215	–0.59667	0.2037***
Own a vacation home					0.67769***
R-squared	0.1791	0.2583	0.2373	0.1901	0.1984

~ = p <.10
* = p <.05
** = p <.01
*** = p <.001
NA = Not applicable.

consistent. Models run on both the AHS and SCF data find that age is the most predominant determinant for vacation homes. The AHS model finds that the odds of owning a vacation home are 3.7 times higher for 45 through 54 year olds than the odds for those under 35. For the age group between 55 and 64, the odds ratio is as high as 6.5. In our SCF model, the numbers are even more dramatic. Compared to the odds for household heads under 35, the odds of owning a vacation home are 11.2 times as large for those between 55 and 64 years old. Why this should be true even after controlling separately for income and especially wealth (which we can do with some precision in the SCF model) is unclear. Wealth is correlated with age, so it is conceivable that the estimates on age are biased and are picking up some of the wealth effect. It could also be that mortgage payments of older homeowners make up a smaller share of their overall budgets, allowing them to spend more on second homes. Nevertheless, it seems plain that life cycle matters a great deal when it comes to the likelihood of owning a second home.

Both data sets suggest that minority households are less likely to own second homes, all else being equal. Both income (current and permanent) and nonhousing wealth are positively associated with second homes in both data sets. But in our propensity model using SCF data, though these two variables are statistically significant, they have little practical effect. With $10,000 more nonhousing wealth, a household's odds ratio of having a vacation home versus not having one is only 1.001, and a $10,000 increase in household current income raises the ratio to 1.005 only. Again, this is surprising and suggests that the correlation of age with wealth and income may be distorting the results.

In the SCF data, education is positively associated with owning a second home. The estimated odds that a college-educated household head would own a vacation home versus no vacation home are more than four times higher than the odds of a household head with less than high school education. In AHS data, there is statistically significant interaction between permanent income and elderly status, suggesting that the effect of permanent income on propensity is indeed different for elderly and nonelderly households.

None of the geographic dummy variables in AHS are statistically helpful in predicting second homes. So second-home ownership is not favored or disfavored by homeowners with primary residences in any particular location. Having investment savings of more than $20,000 in the AHS data or higher nonhousing wealth in the SCF data makes a person more likely to own a vacation home.

Findings from the Elasticity Models

Tables 14.4a to 14.4d show the log-linear estimates in our elasticity models. Both among the nonelderly and elderly households, the models show that vacation-home owners have somewhat lower income elasticity of demand for primary housing (model 2) compared to those not having vacation homes (model 1). When adding the value of vacation homes to that of primary homes, the elasticity is further lower (model 3) compared to those without second homes, having been dragged down by very low demand elasticities for second homes (model 4). For comparison, our estimate of the normal income elasticity of demand for all housing consumption among all homeowners (model 5) shows that there is a slight positive bias in models that fail to incorporate the lower fixed effects behind second-home ownership. These results are in line with our expectations.

Table 14.5
Demand Elasticities Decline with Income Among Higher-Income Nonelderly Homeowners (except for low-income households that have strived to achieve home ownership)

	Annual Permanent Household Income Level	Income Elasticity of Primary Housing Demand	Income Elasticity of Total Housing Demand
Do Not Own a Second Home			
Income Quartile			
High	Over $61,578	1.00	NA
High-mid	$49,840–$61,578	1.28	NA
Low-mid	$40,140–$49,839	1.66	NA
Low	Less than $40,140	0.92	NA
Overall mean	$50,934	1.18	NA
Own a Second Home			
Overall mean	$56,568	0.97	0.83

NA = not applicable.

In our models, income elasticity estimates among the nonelderly sample are higher than those found among the elderly sample, though in part this reflects larger sample sizes for the nonelderly. Taking out the dummy variable on investment savings of $20,000 or more does not change the elasticity pattern (compare tables 14.4c and 14.4d with tables 14.4a and 14.4b).

Our additional test of income elasticities by income level for those not owning a vacation home (table 14.5) shows decreasing income elasticities of demand as income levels rise,[2] supporting our hypothesis that the generally higher income level of second-home owners partly explains their lower overall elasticities of total housing demand relative to those not owning second homes. However, the very low elasticity levels of second-home owners go beyond those expected based on incomes alone. This final test provides compelling evidence that the choice to adjust consumption by adding a second home rather than by increasing the value of the primary residence (through trading up to a higher valued home or making improvements to an existing home) must lower demand elasticities for primary homes among second-home owners even more.

Table 14.6 summarizes our income elasticity models. Statistical significance tests revealed that, for the nonelderly sample, the difference in coefficients of income elasticity of housing demand between those having and those not having vacation homes was significant at the 90 percent confidence level, both in models with and without the wealth variable. For the elderly sample, the difference in elasticities is not significant in either case.

2. The bottom income quartile is an exception, perhaps because people in this quartile have a higher utility for basic necessities other than housing.

Table 14.6
Summary Table of Income Elasticity of Housing Demand

Dependent Variable	Sample Subgroup	Income Elasticity	
		With Wealth Control Variable	Without Wealth Control
Sample Group: Nonelderly Homeowners			
Value of primary home	Do not own a vacation home	1.18137 ***	1.18136 ***
Value of primary home	Own a vacation home	0.97407 ***	0.99413 ***
Value of all homes	Own a vacation home	0.83426 ***	0.84375 ***
Sample Group: Elderly Homeowners			
Value of primary home	Do not own a vacation home	0.66429 ***	0.66632 ***
Value of primary home	Own a vacation home	0.52075 **	0.55193 **
Value of all homes	Own a vacation home	0.52298 **	0.55856 **

~ = p <.10
* = p <.05
** = p <.01
*** = p <.001

Conclusions

The propensity models reported here are perhaps the first efforts to model the determinants of second-home ownership. The age of the household head, the minority status of the household head, household income (both current and permanent), and household nonhousing wealth are good predictors of second-home ownership.

Our income elasticity models produce results consistent with the hypothesis that those having second homes have somewhat lower income elasticity of housing demand, as their resources have to be divided among more than one home. Even when including second-home value in measuring housing consumption, homeowners with second homes still have lower income elasticity.

APPENDIX 1. PERMANENT INCOME REGRESSION (BOX-COX $\lambda = 0.5$)

Type II Variable	DF	Coefficient	Sum of Squares	Mean Square	F Value	pr > F
Intercept	1	403.86801	1.109E8	1.109E8	6785.57	<.0001
High school	1	35.38528	3725311	3725311	227.91	<.0001
Some college	1	65.19025	1.11E7	1.11E7	679.24	<.0001
College graduate or higher	1	127.61739	4.126E7	4.126E7	2524.14	<.0001
Minority	1	–24.84862	2040145	2040145	124.81	<.0001
Age 35–44	1	24.90867	1501197	1501197	91.84	<.0001
Age 45–54	1	33.39170	2498400	2498400	152.85	<.0001
Age 55–64	1	–7.97708	109798	109798	6.72	0.0096
Age 65+	1	–81.02657	1.294E7	1.294E7	791.76	<.0001
Married with children	1	–4.44193	60606	60606	3.71	0.0542

Single parents	1	–100.95346	1.148E7	1.148E7	702.51	<.0001
Other family type	1	–41.75909	3199519	3199519	195.74	<.0001
Single person household	1	–116.24828	4.584E7	4.584E7	2804.29	<.0001
Other nonfamily type	1	–38.83794	1178943	1178943	72.13	<.0001
New England suburb	1	21.33853	379576	379576	23.22	<.0001
New England nonmetropolitan	1	–18.22930	222799	222799	13.63	0.0002
Midwest city	1	–8.13391	49158	49158	3.01	0.0829
Midwest suburb	1	4.77603	20730	20730	1.27	0.2601
Midwest nonmetropolitan	1	–25.81154	523873	523873	32.05	<.0001
South city	1	–17.94502	241412	241412	14.77	0.0001
South suburb	1	–12.29114	134174	134174	8.21	0.0042
South nonmetropolitan	1	–36.61865	1198814	1198814	73.34	<.0001
West city	1	5.97286	24587	24587	1.50	0.2200
West suburb	1	5.68575	26090	26090	1.60	0.2065
West nonmetropolitan	1	–24.32725	334514	334514	20.46	<.0001
Rooted MSE		127.85071				
Adjusted R square		0.3523				
N		27908				

APPENDIX 2. VARIABLE DEFINITIONS FOR PERMANENT INCOME REGRESSION

Variable	Definition
High school	1 if high school graduate, 0 otherwise
Some college	1 if some college education, 0 otherwise
College graduate or higher	1 if college graduate, 0 otherwise
Minority	1 if minority, 0 otherwise
Age 35–44	1 if 35–44, 0 otherwise
Age 45–54	1 if 45–54, 0 otherwise
Age 55–64	1 if 55–64, 0 otherwise
Age 65+	1 if 65 or over, 0 otherwise
Married with children	1 if married with kids, 0 otherwise
Single parents	1 if single parent, 0 otherwise
Other family type	1 if other family type, 0 otherwise
Single person household	1 if single person household, 0 otherwise
Other nonfamily type	1 if other nonfamily type household, 0 otherwise
New England suburb	1 if NE suburb, 0 otherwise
New England nonmetropolitan	1 if NE nonmetro, 0 otherwise
Midwest city	1 if Midwest city, 0 otherwise
Midwest suburb	1 if Midwest sub, 0 otherwise
Midwest nonmetropolitan	1 if Midwest nonmetro, 0 otherwise
South city	1 if South city, 0 otherwise
South suburb	1 if South sub, 0 otherwise
South nonmetropolitan	1 if South nonmetro, 0 otherwise
West city	1 if West city, 0 otherwise
West suburb	1 if West sub, 0 otherwise
West nonmetropolitan	1 if West nonmetro, 0 otherwise

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