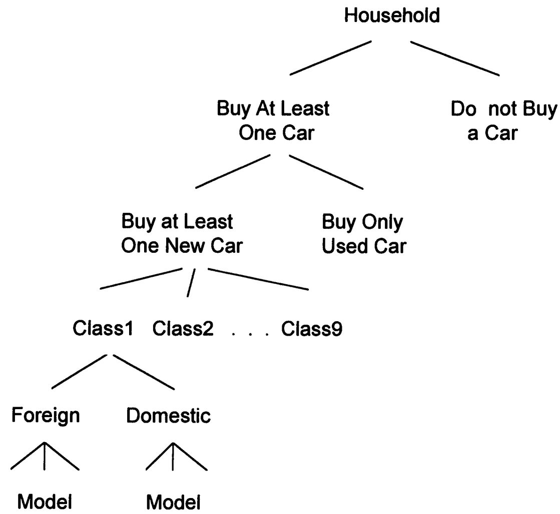

FIGURE 1.—Automobile choice model.

As shown in McFadden (1978, 1981), the assumption of the generalized extreme value distribution implies that the conditional choice probabilities at each node s of the tree, as well as the marginal probability of purchasing a car, will be given by multinomial logit formulas that have the following general form:

$$P^h_{i_s/j_{s-1}} = \exp\left(X^h_{i_s}\theta_s/\lambda_{j_{s-1}} + I^h_{i_s}\lambda_{i_s}/\lambda_{j_{s-1}}\right) \Big/ \sum_{k\in C_{j_{s-1}}} \exp\left(X^h_{k_s}\theta_s/\lambda_{j_{s-1}} + I^h_{k_s}\lambda_{k_s}/\lambda_{j_{s-1}}\right)$$

where

$$I^h_{i_s} = \log\left[\sum_{p\in C_{i_s}} \exp\left(X^h_{p_{s+1}}\theta_{s+1}/\lambda_{i_s}\right)\right].$$

The subscript i_s denotes a specific alternative within the choice set $C_{j_{s-1}}$, where j_{s-1} denotes the previous stage choice on which the current decision is conditioned (similarly the subscript $s+1$ refers to one tree node below the current one), $X^h_{i_s}$ represents a vector of explanatory variables specific to alternative i_s at stage s, and θ_s is the parameter vector specific to stage s to be estimated. The inclusive value terms $I^h_{i_s}$ measure the expected aggregate utility of subset i_s while the coefficients $\lambda_{i_s}/\lambda_{j_{s-1}}$ which are estimated along with the parameters θ in the model, reflect the dissimilarity of alternatives belonging to a particular subset. As McFadden (1978) has shown, the nested structure depicted in Figure 1 is consistent with random utility maximization if and only if the coefficients of the inclusive value terms lie within the unit interval. As the dissimilarity coefficients approach 1, the distribution of the error terms tends towards an iid extreme value distribution and the choice probabilities are given by the simple multinomial logit model. As the coefficients approach 0, the error terms become perfectly correlated and consumers choose the alternative with the highest strict