Understanding Migration Aversion using Elicited Counterfactual Choice Probabilities*

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Abstract

This paper investigates how migration and location choice decisions depend on a large set of location characteristics, with particular focus on measuring the importance and nature of non-monetary costs of moving. We employ a stated-preference approach to elicit respondents' choice probabilities for a set of hypothetical choice scenarios, using two waves from the NY Fed's Survey of Consumer Expectations. Our stated probabilistic choice approach allows us to recover the distribution of individual-level preferences for location and mobility attributes without concerns about omitted variables and selection biases that hamper analyses based on observed mobility choices alone. We estimate substantial heterogeneity in the willingness-to-pay (WTP) for location characteristics and in moving costs, both across and within demographic groups. We find moving costs to be strongly associated with attachment to the current neighborhood and dwelling and to social networks. Our results indicate evidence of sorting into current locations based on preferences for location attributes as well as a strong negative association between respondents' non-monetary moving costs and their moving expectations and actual mobility decisions.

JEL Classification: J61, R23, D84

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1 Introduction

Residential mobility rates in the U.S. have fallen steadily over the past three decades. While 19.6% of U.S. residents changed residence within the United States in 1985, only 9.8% did so in 2018, its lowest level since 1948 when the Census Bureau began tracking mobility.[1] As shown in Figure 1, the decline in the annual mobility rates—which actually seems to have started sometime before the most recent peak in 1985—has been persistent through business cycles and has occurred at different levels of geographic detail. The causes of the long-term decline in mobility remain largely unexplained, but there is wide consensus on the existence of large fixed costs associated with both short-term and more permanent moves serving as an important deterrent to moving (Davies, Greenwood, and Li, 2001; Kennan and Walker, 2011; Bayer and Juessen, 2012; Bayer et al., 2016).

Despite their importance, relatively little is known about the sources of these moving costs. The goal of this paper is to investigate how migration and location choice decisions depend on a large set of location characteristics, with particular focus on measuring the importance and nature of the non-monetary cost of moving. We go beyond previous research in unpacking moving costs, distinguishing between the importance of direct "box and truck" moving costs, the value of proximity to family and friends, agreeability with local social norms and values, and attachment to the current location and dwelling. We also collect data on moving attitudes or "mover types," where we ask individuals to classify themselves as "mobile," "stuck," or "rooted" (Florida, 2009). A better understanding of the sources of high moving costs and of the roles of moving attitudes could shed light on factors contributing to the secular decline in migration.

We estimate preferences by employing a stated-preference approach that elicits respondents' choice probabilities for a set of hypothetical choice scenarios, using two waves from the New York Fed's Survey of Consumer Expectations (SCE). Previous studies of migration are largely based on observational data at either the aggregate, individual, or household level. Two recent exceptions, both focusing on (international) labor migration, are Baláž, Williams, and Fifeková (2016) and Lagakos, Mobarak, and Waugh (2018). Using discrete choice hypothetical scenarios, the former analyzes university students' emigration decisions from Slovakia, while the latter examines seasonal migration decisions of migrant workers in rural Bangladesh. Our paper instead contributes to the U.S. literature on internal migration and location choice decisions. Moreover, it does so using a stated-preference choice experiment that elicits choice probabilities rather than binary discrete

[1] While there exists variation in computed mobility rate levels based on different data sources, they all show a declining long-term trend (Molloy, Smith, and Wozniak, 2011; Kaplan and Schulhofer-Wohl, 2012).

choices. The empirical evidence supports our stated probabilistic choice framework. Our approach permits estimation of individual-level preferences without imposing any restrictions on the underlying preference heterogeneity (Blass, Lach, and Manski, 2010; Wiswall and Zafar, 2018). Preferences for home and neighborhood characteristics are likely to vary considerably across households. For example, those with children and childcare needs may care more about school quality and benefit more from having family living nearby. Allowing for an unrestricted form of heterogeneity also permits us to more carefully examine the across-household variation in estimated moving costs and their underlying determinants.

Our analysis incorporates several attributes found to be important in previous research on migration and location decisions, such as income prospects, characteristics of housing units, neighborhood amenities and public goods, including crime rates and school quality.[2] Based on estimates from our model we then compute each individual's willingness to pay for different home and location characteristics, and assess the extent of sorting into current locations based on preferences for these attributes. Finally, we examine how an individual's moving costs are related to his or her reported moving expectations and actual moving behavior observed in the SCE.

This study intersects two broad areas of research: the literature on moving costs, and the literature on the use of hypothetical choice experiments. We contribute to the literature on moving costs by adopting a stated probabilistic choice methodology in which we experimentally vary location attributes to analyze their impact on mobility and location choice decisions. This allows us to estimate preferences for attributes that typically are not observed in revealed preference data. Moreover, our approach allows us to estimate preferences for different housing and location attributes by overcoming omitted variable and endogeneity biases that may arise due to missing information on the characteristics of non-chosen alternatives as well as of the chosen location.[3] Furthermore, we can obtain an estimate of the non-monetary cost of moving that is not confounded by preferences for other location amenities.

Our study also contributes to the relatively young literature on the use and value of elicited

[2]Much of the migration literature has focused on the importance of employment opportunities and job search in the decision to move or stay in a current location (Bartel, 1979; Tunali, 2000; Dahl, 2002; Kennan and Walker, 2011; Gemici, 2011). Studies in the literature on residential location choice that consider housing and location attributes include Quigley (1976); Bajari and Kahn (2005); Quigley (1985); Rapaport (1997); Nechyba and Strauss (1998); Bogart and Cromwell (2000); Cullen and Levitt (1999); Bayer, Ferreira, and McMillan (2007); and Bayer et al. (2016).

[3]For example, when relating house prices to local amenities, the latter are likely to be correlated with other omitted location conditions, leading to biases in preference and willingness-to-pay estimates (Bayer, Keohane, and Timmins, 2009). Similarly, Bayer and Juessen (2012) discuss the implications of dynamic self-selection and sorting in modelling and analyzing migration behavior, while Bayer, Keohane, and Timmins (2009) show how standard hedonic models assuming perfect (free) mobility will produce biased estimates of the willingness to pay for local amenities in the presence of moving costs.

probabilities in stated choice experiments. Representing an important innovation to stated choice analysis, Blass, Lach, and Manski (2010) showed the value of eliciting choice probabilities over the traditional practice of asking participants in stated choice experiments to select their most preferred choice. First, it directly addresses the incompleteness of typical choice scenario descriptions in stated choice experiments, allowing respondents to express uncertainty about their behavior in such scenarios. Second, elicited probabilities can contain more information about the respondent's preferences such as whether he or she is close to indifferent between two alternatives. In adopting this approach we follow Wiswall and Zafar (2018) and use elicited choice probabilities to estimate the distribution of preferences and willingness to pay for different attributes.

Our estimates point to substantial heterogeneity in willingness-to-pay for location attributes. Mean non-monetary moving costs are roughly equivalent to 100% of income, but are much smaller for the "mobile" (34%) and much larger for the "rooted" (230%) respondents. These moving costs are somewhat lower (62%) for a local move (within 10 minute walking distance). Among location attributes, we find a strong average preference for living near family, with the rooted (56%) valuing it much more than the mobile (29%). We find substantial heterogeneity in preferences even within demographic groups. The distributions of preferences and WTPs for most of the location attributes are asymmetrical and have long tails. For example, we estimate that the median individual has a non-monetary moving cost of $\$31,000$, but that nearly 25% of people have moving costs larger than $\$100,000$ and 20% of people have zero or negative moving costs. On the other hand, the preference distribution for home size is symmetrically centered near zero. In addition, correlations between our estimated WTPs and demographic characteristics indicate that our results match well with those of previous studies. For example, we document that moving costs increase with age, and are larger for homeowners and the "rooted". Families with young children have much larger WTPs for additional home size. College graduates have a weaker distaste for moving a farther distance.

As a validation exercise, we analyze the relation between our estimates for the non-monetary moving costs and actual moving decisions. We find that the respondents who subsequently are observed to change residence have substantially lower moving costs compared to those not observed to move. We also relate our WTP estimates for a variety of location attributes to the values of those attributes in respondents' current, already chosen locations. Our results suggest a robust systematic relationship between estimated preferences and self-reported actual location characteristics, providing evidence for sorting based on preferences.

The remainder of this paper proceeds as follows. The next section provides background on the evidence and implications of large moving costs and reviews the literature on stated choice analysis using elicited choice probabilities in relation to our methodology and findings. Section 3 describes our data, reports descriptive statistics, and discusses the design of the experimental setup. In this section, we also lay out some important considerations for the design of stated probabilistic choice experiments. Section 4 describes our model and estimation method. Section 5 presents estimates of location and mobility preferences and explores the willingness-to-pay for different location attributes. In Section 6, we relate our findings based on hypothetical choice data to revealed preference data on current location choices, actual mobility decisions and mobility expectations. The final section offers concluding remarks.

2 Related Literature

We now discuss related research on moving costs and stated probabilistic choice analysis, which are the two areas to which our paper contributes.

2.1 The Literature on Moving Costs

There is growing concern about the implications of declining mobility for labor market efficiency, economic dynamism, economic growth, intergenerational mobility and inequality. A related interest pertains to broader questions about the reasons and implications of large estimated moving costs in the literature on internal migration in the U.S. (Bartik, Butler, and Liu, 1992; Bayer and Juessen, 2012; Bayer et al., 2016; Beaudry, Green, and Sand, 2014; Davies, Greenwood, and Li, 2001; Kennan and Walker, 2010, 2011). Similar evidence of large non-monetary moving costs exists for international migration (Hanson, 2010), but generally little is known about the underlying reasons for the large international migration costs. Recent exceptions are Baláž, Williams, and Fifeková (2016) and Lagakos, Mobarak, and Waugh (2018). Baláž, Williams, and Fifeková (2016) use a series of discrete choice experiments to analyze factors influencing emigration from Slovakia, focusing on wages, cost of living, health, crime, language difficulty, personal freedom, and life satisfaction. They find that wages and cost of living can only explain a modest part of emigration choices, implying a sizable role of non-monetary factors. Lagakos, Mobarak, and Waugh (2018) estimate a structural model of migration choices of rural migrants using data from a randomized field experiment that extended one-time migration subsidies to poor, landless households in Bangladesh. They find evidence of substantial non-monetary utility costs of migration. Interestingly, the authors then validate their findings using responses from a separate stated discrete choice experiment (administered to the same experimental sample). They attribute the large moving costs to bad housing conditions in urban destination locations.

The large cost estimates from internal and international migration studies indicate that individuals are willing to pay sizeable shares of their annual incomes to stay where they are. The shares tend to be much too large to be attributed solely to financial moving costs. Moving costs include direct monetary and time costs associated with moving as well as non-monetary costs. The latter include psychic costs of changing one's environment; disutility of moving away from family, friends and a familiar environment and concerns about adjusting to the surroundings in a new location (Sjaastad, 1962).[4]

In addition to their importance as an impediment to migration, large moving costs may reduce labor mobility's responsiveness to local shocks (Beaudry, Green, and Sand, 2014). Labor migration is an important mechanism of economic adjustment during a downturn and for coping with regional differences in economic vitality (Blanchard and Katz, 1992). Large mobility costs are likely to limit or slow down such adjustment effects to local shocks, contributing to lower productivity, higher national unemployment and more persistent geographic differences in unemployment rates.

Evidence of large fixed moving costs is also of relevance to the large macroeconomic literature on housing, in which such costs are often assumed to be zero, with the exception of matching models of the housing market (Han and Strange, 2015). In the latter, a high match value captures the homeowner's preferences for the current home and neighborhood, which generally corresponds to high non-monetary moving costs. The existence of high non-monetary moving costs could also help explain the low default rate of underwater homeowners (Foote and Willen, 2018; Laufer, 2018). Interestingly, in a calibrated structural model of mortgage default with non-monetary moving costs, Low (2020) shows that high non-monetary moving costs could play an important role not only in explaining low defaults by underwater borrowers but also in explaining the relatively high default rates of above-water homeowners. When hit by a negative income shock, rather than selling their home (and capturing the equity), some borrowers with high moving costs may default in the hope that their income will soon recover, and as an attempt to keep their home.

[4] Moving costs may also include job switching costs, foregone earnings and traveling costs while searching for a home and job, and possible loss of professional networks, schools, doctors, etc. High estimated moving costs could also reflect insufficient savings or an inability to borrow to finance a move.

2.2 Stated choice analysis using elicited choice probabilities

In order to assess how migration and residential location choice decisions vary with location characteristics on a common interpersonally comparable scale, we use a hypothetical stated choice methodology to estimate preferences for different migration and location choice attributes. More specifically, we ask respondents to assign a probability of choosing among a fixed set of alternatives (Blass, Lach, and Manski, 2010).[5] The elicitation of choice probabilities provides respondents an ability to express uncertainty about their behavior in incomplete scenarios (Manski, 1999) and represents an important innovation to stated choice analysis. In a vast literature, especially in environmental and natural resource economics, marketing, and increasingly in various subfields of empirical microeconomics,[6] it has been common practice to ask participants in stated choice experiments to select their most preferred choice or, less frequently, to rank a list of alternatives from most to the least preferred.[7] In addition to addressing the incompleteness of typical choice scenario descriptions in stated choice experiments (with respondents given only a subset of the information they would have in actual choice settings), eliciting choice probabilities allows individuals to provide more valuable information than if they had been asked only about their most preferred choice alternative or choice ranking.

Following its introduction by Blass, Lach, and Manski (2010), who used the approach to analyze preferences for the reliability of electricity services, choice probabilities for hypothetical choice scenarios have been elicited by Delavande and Manski (2015), Morita and Managi (2015), Boyer et al. (2017), Shoyama, Managi, and Yamagata (2013), and Wiswall and Zafar (2018) to respectively study voting behavior and preferences for political candidates, consumers' willingness to pay for electric power generated from different sources, preferences for long-term care insurance products, public preferences for land-use scenarios, and preferences for workplace attributes.

A related area of research has been the use of elicited choice probabilities in information experiments. Rather than hypothetical choice scenarios, participants in such experiments are

[5]The general idea of measuring choice intentions probabilistically dates back to Juster (1966), but the use of a probabilistic question format to elicit intentions and expectations in economics was popularized by Charles Manski. By now, a large body of research has demonstrated survey respondents' general willingness and ability to respond meaningfully in probabilistic terms when asked about uncertain events of relevance in their lives (Manski, 2004; Delavande, 2014; Potter et al., 2017).

[6]Topics include labor supply (Kimball and Shapiro, 2010), retirement behavior (Van Soest and Vonkova, 2014), long-term care (Ameriks et al., Forthcoming; van Ooijen, de Bresser, and Knoef, 2019), medical insurance demand (Kesternich et al., 2013), housing demand (Fuster and Zafar, 2015), seasonal migration (Lagakos, Mobarak, and Waugh, 2018), and working conditions and wages (Mas and Pallais, 2017; Maestas et al., 2018).

[7]The former class of stated preference experiments in which individuals are asked to make a discrete choice is known as discrete choice experiments. The latter class, which asks individuals to rank a list of alternatives from most to the least preferred, is known as contingent ranking.

asked about their subjective probabilities of making certain future choice decisions and about the expected outcomes or returns associated with those decisions. After reporting their subjective choice probabilities respondents are then randomly assigned information related to these choice specific outcomes in the population, and asked how this information affects their choice probabilities. Wiswall and Zafar (2015), Ruder and Noy (2017), and Baker, Bettinger, Jacob, and Marinescu (2018) conducted such experiments to study the impact of labor market information on college major choices of students. Bleemer and Zafar (2018) similarly analyzed the impact of information about "college returns" and "college costs" on intended college attendance. The econometric framework that relates college major and college attendance choice probabilities to expected outcomes such as wages, is comparable to that relating choice probabilities to attributes in stated choice experiments.

Our use of subjective choice probabilities in stated choice experiments is also related to the broader area of economic research analyzing the relationship between expectations of future returns and choice behavior or intentions.[8] An important challenge faced in this research is the likely presence of omitted variables (unobserved attributes or circumstances) related to both expected outcomes and choice behavior. For example, in estimating a consumer price elasticity using consumption or spending intentions data, (expected) prices are likely to be correlated with unobserved product quality, leading to biases.

A notable advantage of the use of stated-choice experiments and information experiments over the use of non-experimental data is the ability to experimentally vary choice attributes to analyze their impact on choice decisions. In doing so, the researcher can hold fixed everything in the choice situation that he wants to hold fixed, and concentrate only on the choice attributes that he is primarily interested in. Moreover, in designing the stated choice experiment, one is not limited to the variation in attributes observed in revealed preference data. Finally, as discussed in greater detail later, a stated choice methodology with elicited choice probabilities will allow identification of preferences under weak assumptions about the form of preference heterogeneity (Wiswall and Zafar, 2018).

3 Data

To describe our approach and findings, in this section we provide an outline of the data set used in our analysis, present descriptive patterns, and explain our experimental setup.

[8] See Arcidiacono, Hotz, and Kang, 2012; Stinebrickner and Stinebrickner, 2014; Schweri and Hartog, 2017; Wiswall and Zafar, 2015; Delavande and Zafar, 2019; Cecere, Corrocher, and Guerzoni, 2018; Armona, Fuster, and Zafar, 2018.

3.1 Survey of Consumer Expectations

Our data come from the New York Fed's Survey of Consumer Expectations (SCE), which is a monthly online survey of a rotating panel of individuals.[9] The survey is nationally representative and collects data on demographic, education, health, and economic variables for a sample of household heads. It also elicits individual expectations about macroeconomic and household-level outcomes related to inflation, the labor market, household finance, and other variables. Each month, approximately 1,300 people are surveyed. Respondents participate in the panel for up to 12 months, with a roughly equal number rotating in and out of the panel each month. Our data set uses three waves of the SCE: January 2018, September 2018 and December 2019. In each of those waves, we supplemented the core SCE questionnaire with a special survey module designed to study migration and residential location decisions.

The January 2018 survey served as a pilot survey to inform the experimental design adopted in the two subsequent surveys. The survey module first asks respondents about their most recent move and their probability of moving within the next two years, along with collecting some contextual variables, such as proximity of family members and local tax rates. It then asks respondents to rate the relative importance of several determinants of migration and location choice decisions, asking separately about factors in favor of and against moving over the next two years.

In contrast to these qualitative measures of relative importance, we then designed a set of questions as part of a choice experiment to obtain a quantitative assessment of importance. We did this in the September 2018 and December 2019 waves. We present an excerpt of these questions from the December wave in Figure 2.[10] Specifically, we collect data on individuals' probabilities of choosing from a set of hypothetical locations, as well as their current location. We experimentally vary the characteristics of the locations in order to identify individuals' preferences for various location attributes. The answers to these questions can then be used to measure the willingness to pay, or required compensation costs, for different location attributes.

Before discussing the experiments in greater detail, we first present some descriptive evidence on the representativeness of our sample, and on how migration considerations and expectations vary across individuals.

[9] The survey is conducted on behalf of the Federal Reserve Bank of New York by the Demand Institute, a non-profit organization jointly operated by The Conference Board and Nielsen. Armantier et al. (2017) provides a detailed overview of the sample design and content of the survey.

[10] A full list of our supplemental questions is available in Online Appendix B.

3.2 Descriptive patterns

In Table 1, we list characteristics of our SCE sample compared with the 2017 American Community Survey. From a demographic standpoint, our sample matches up well with the general US population of household heads.[11] Some 35% of household heads are college graduates, while 70% own the home they live in. In addition to demographics and education, we also collect information on individuals' health status. About half of our sample classifies themselves as being in very good or excellent health. Prior to moving to the current residence, 63% lived in the same county, 20% lived in the same state but different county, and 16% lived in a different state. Finally, following Florida (2009) we ask people to classify themselves by their ability and willingness to move, as being "mobile," "stuck," or "rooted." Mobile individuals consider themselves to be open to, and able to move to locations if an opportunity comes along, while rooted individuals consider themselves strongly embedded in their community and able but unwilling to move. Stuck individuals have a desire to move but face insurmountable constraints in doing so.[12] Just over half of our sample reports being rooted, while just over one third classifies themselves as mobile and about one in eight classify themselves as being stuck.

In addition to matching well the demographic and economic distribution of the United States population, our sample also matches the migration distribution quite well. Specifically, we document low observed and expected migration rates, and migration rates that decline with distance. In Table 1, we find that 15% of household heads changed residence in the past year, compared with 13% in the ACS. Moreover, the distribution of migration distance for those who moved is nearly identical between the two surveys, where 16% of movers crossed state lines in each. In Figure 3, we show the distribution of individuals' self-reported likelihood of moving within the next two years. Over 25% of the sample report a 0% chance of moving, while 4% report a 100% probability of moving. The median person reports a 10% chance of moving, with the average person reporting a 27% chance of moving. The average and median *subjective* likelihood of moving is in the same range as the observed *actual* frequency of moving.

In Table 2, we examine the self-reported probability of moving over the next two years and other demographic characteristics of those self-identified as mobile, stuck, and rooted. We also report,

[11] For further details on the representativeness of the SCE, see Armantier et al. (2017).

[12] The precise wording of the question, which was asked at the very end of each wave, was "In terms of your ability and willingness to move, which of the following best describes your situation? [Please select only one]. *Mobile* - am open to, and able to move if an opportunity comes along; *Stuck* - would like to move but am trapped in place and unable to move; *Rooted* - am strongly embedded in my community and don't want to move.

for the mobile and stuck, whether these characteristics are statistically different from those of the rooted. As expected, those who identify themselves as rooted have the lowest average subjective migration likelihood (15%), while those who report being mobile have the largest average subjective likelihood of moving over the next two years (39%). The rooted tend to be disproportionately white, older, married, and homeowners, and also are more likely to live in rural areas. The rooted and stuck are also more likely than the mobile to live within 50 miles of family. Those who report being stuck have lower education and worse health, and are more likely to live in cities.[13] Interestingly, the mobile and the rooted have similar levels of education and income, although the mobile are more likely to live in cities.

To qualitatively get a sense of different reasons for why people may not want to move, we asked respondents to rate the importance of a set of possible reasons for *not* moving to a different primary residence over the next 2 years, on a rating from 1 (not at all important) to 5 (extremely important). Table 3 shows the fraction of respondents who find each factor very (4) or extremely important (5), ordered from highest to lowest average importance in our overall sample. Among the factors rated most important for not moving are satisfaction with the current home, neighborhood and job, proximity to family and friends, the unaffordability and undesirability of alternative locations, and a high perceived cost of moving. Several determinants discussed in the literature, such as state licensing requirements, a potential loss of welfare benefits, mortgage rate lock-in, and difficulty in qualifying for a new mortgage are rated low on average as factors for not moving. While rated less important overall, however, these well-documented determinants of migration could be of greater importance for a smaller subset of respondents. For example, welfare benefits may well be an important driver of migration for some individuals (Borjas, 1999; Kennan and Walker, 2010; Giulietti and Wahba, 2013).

Those self-identified as rooted rate satisfaction with their current home and neighborhood, living near family and friends, and involvement in local community or church as the most important reasons for not moving. In contrast, those who describe themselves as stuck rate the unaffordability of homes in alternative locations, the high perceived cost of moving, and difficulty in qualifying for a new mortgage as more important, compared to the other two groups. They also express less satisfaction with their current job and are less optimistic about job prospects elsewhere.

In Table 4, we asked respondents to rate the importance of various factors as reasons in favor of moving to a different residence over the next two years and we found similar patterns as in Table

[13] The correlation between "stuck" and living in city centers may be due to high housing costs acting as a barrier to moving. As we will show shortly, the "stuck" appear to have a strong distaste for housing costs, but they also appear to be less optimistic about job prospects in other locations.

3. Comparing Tables 3 and 4, we find that the average respondent has much stronger views about reasons *not* to move than about reasons to move.

3.3 Experimental Setup

In this section, we offer some general comments regarding the design of stated-choice experiments, followed by a description of the specific design of our experiment.

3.3.1 General considerations in designing choice experiments

In a typical stated-choice experiment, participants are asked to consider a set of different choice scenarios with each describing a finite set of discrete choice alternatives. Irrespective of whether the experiment is designed to elicit binary choices, choice rankings, or choice probabilities, several decisions need to be made in setting up choice options and scenarios. There exists a vast literature on the design of stated choice experiments (Louviere et al., 2000). Here we just mention a few key considerations. First, in hypothetical choice scenarios it is important to keep the number of choices limited, with two-, three- and four-alternative formats being most common. There is considerable freedom in selecting attributes and choice alternatives. In fact, an important strength of stated choice experiments is the possibility of including attributes and choice options not previously considered, measured or chosen by individuals. However, it is generally seen as important to have the choice setup mimic real-life decisions. For this reason, it is a general recommendation for stated preference practitioners to include a status-quo or reference option (Johnston et al., 2017; Lancsar and Louviere, 2008), despite a risk of status-quo bias (Rabin, 1998).

Second, given the recommended small size of the choice set, one can typically accommodate a relatively large number of attributes by only varying a small subset of attributes at a time. In doing so it is important to instruct respondents that choice alternatives only differ in the attributes that are explicitly listed, and are otherwise identical in terms of any other attributes. This minimizes concerns that certain choice attributes could signal other, unspecified choice characteristics. In cases of many attributes, it is common practice to assign respondents randomly to subsets of choice alternatives and attributes in order to reduce cognitive burden and maximize response rates in discrete choice experiments (Watson, Becker, and de Bekker-Grob, 2017).

Third, to identify preferences with respect to multiple attributes requires independent variation in each of them. For example, with three attributes, one would need four choice scenarios with independent variation in each attribute to be able to identify linear effects. Additional scenarios would be required for analyzing nonlinear effects or interaction effects. There is a large literature on how to optimally design variation in attributes across scenarios, including so-called D-efficient or D-optimal designs (Kuhfeld, Tobias, and Garratt, 1994). Derived for discrete choice experiments, it is unclear to what extent these findings apply to stated probabilistic choice experiments.

Before discussing the experimental setup chosen for this study, we would like to point out our main motivation for eliciting choice probabilities rather binary (or discrete) choice indicators. As explained below, when asking about choices in a hypothetical setting, the approach accommodates remaining uncertainty about unspecified attributes or states of the world in which choices ultimately will be made (which Blass, Lach, and Manski (2010) label *resolvable uncertainty*). By asking for choice probabilities, we provide respondents the opportunity to express such uncertainty. In doing so, we collect richer information regarding the individual's preferences than if the respondent were forced to make a binary choice. For example, if, among three alternatives, two are highly preferred to the third and the individual is close to indifferent between the first two, this would be much better captured in reported choice probabilities. Of course, whether such resolvable uncertainty exists is an empirical question that we will be able to evaluate below.

3.3.2 Design of our stated probabilistic choice experiment

The goal of our stated-probabilities design is to collect data on individuals' probabilities of choosing from a set of hypothetical locations, including their current location. The inclusion of the no-move option was necessary for us to study the cost of moving (a key goal in our paper), but as mentioned earlier, it also makes the choice setup more realistic of real-life mobility decisions. We experimentally vary the characteristics of the locations in order to identify individuals' preferences for various location attributes. As discussed earlier, because we can only consider a subset of location attributes, an important feature of our design is that we explicitly instruct respondents that locations only differ in the location attributes we list, but are otherwise identical in terms of any other characteristics.

The choice of location attributes for our stated choice experiment was based largely on the empirical findings from the pilot survey, discussed in the previous subsection, in which we directly asked respondents to assess the importance of a large number of factors in the decision to move or not move to a different location over the next two years (see Tables 3 and 4). To keep the number of cases and scenarios manageable, we restricted our analysis to 12 attributes that we deemed most important or interesting. These include income prospects, housing costs, proximity to family and friends, local social norms and values, state and local taxes, school quality, crime, home size, similarity of new home to current dwelling, whether the move is a local move, distance from current location, and "box and truck" moving costs.

A substantial literature has demonstrated the roles of income prospects and housing costs in migration and location choice decisions. Consistent with our findings in the pilot survey, several studies in the literature also point to the importance of family and friends and social networks more generally in migration decisions (Dahl and Sorenson, 2010; David, Janiak, and Wasmer, 2010; Bailey et al., 2018; Büchel et al., 2019). Our inclusion of an indicator for agreeability with local social norms and values is motivated in part by an interest in assessing the importance of cultural roots and cultural biases in migration decisions (Falck, Lameli, and Ruhose, 2018).[14]

To capture attachment to the current home and residential location we included in our scenarios choices of moving to an identical copy of the current home, and of "moving locally," meaning only a short distance from the current location (0.2 miles). Familiarity and attachment to the particular features of a dwelling, and with places and people living nearby (including social and professional networks such as a church community or doctors) are frequently cited as representing important non-monetary costs of moving. Such costs may be especially large for families with children, who typically have more frequent interactions with nearby households. The inclusion of moving distance was similarly motivated as a way to capture distance to social contacts as well as informational costs (Greenwood, 1975). Finally, our consideration of subjective assessments of local crime rates and school quality as measures of local amenities and public goods was motivated by evidence of their importance in the literature (Bartik, Butler, and Liu, 1992; Bayer et al., 2016; Sampson and Wooldredge, 1986).

To accommodate a relatively large number of location attributes, while keeping manageable the cognitive burden of choosing among a potentially very large set of choices, we limited the choice scenarios by (*i*) varying subsets of 3 attributes at a time and (*ii*) providing three choice alternatives in each choice setting. For each scenario, respondents are asked for the percent chance of choosing each of the alternatives shown, where chances given to choice alternatives must add up to 100. Altogether in the two survey waves combined, we included 44 different scenarios which were divided into 11 blocks of four scenarios each. Within each block, scenarios varied in the different values assigned to the three attributes across location. Blocks differ in the sets of attributes considered. To

[14]Social norms and values relate to how individuals treat other people or how they should or should not behave in various social situations. They reflect religious, moral and political views and preferences and culture, and can evolve and shift over time and space (Young, 2015).

facilitate comparisons in monetary terms, all groups included household income prospects in the location as one of the attributes. In each of our surveys, respondents were randomly assigned to four out of the six blocks of scenarios, so in both the September 2018 and December 2019 waves, each individual respondent faced 16 different choice scenarios.[15]

We exogenously varied attribute levels with the intention of creating realistic variation in location choices. We did so by trading off practical and statistical considerations; creating sufficient variation to enable estimation, but without having choice scenarios with alternatives that are clearly dominated. We decided against using a so-called D-efficient or D-optimal design (Kuhfeld, Tobias, and Garratt, 1994). While motivated by the same considerations, this approach requires the econometric model to be fully pre-specified and requires good prior information on the likely parameter values. Moreover, as previously discussed, it is unclear whether recommended designs for discrete choice experiments in which agents make binary choices, are also optimal for the case where respondents instead provide choice probabilities.

4 Model & Estimation

We now introduce our theoretical and empirical framework for estimating location preferences from hypothetical choice sets. We first introduce a canonical random utility model (McFadden, 1978), followed by our empirical model which makes use of the probabilistic hypothetical choice data that we have collected. We then discuss how the model's parameters are identified and describe our estimation procedure. Finally, we review benefits from using a stated probabilistic choice approach.

4.1 Random utility model of migration and location choice

We consider a model of location choice (Davies, Greenwood, and Li, 2001), where individuals are indexed by i and locations are indexed by j. Utility is a function of X_j, which is a vector of attributes describing the location, and M_j, which is an indicator equal to unity if choosing j requires moving and zero otherwise. Utility for a given location is also a function of an idiosyncratic preference shock ε_{ij}, which captures any remaining location-specific preferences of individual i for location j. This idiosyncratic component is observed by the decision maker at the time of the choice decision, but not by the econometrician, and reflects all the remaining attributes that might affect preferences. We

[15] Due to a technical error, half of the September wave answered 12 scenarios instead of 16. See Appendix Table A1. With 632 individuals assigned on average to each block, the sample size for our study is towards the high end of the range typically used in discrete choice experiments (de Bekker-Grob et al., 2015).

assume that preferences take the usual linear-in-parameters form with additive separability between the observed attributes and idiosyncratic shocks:

$$u_{ij} = X_j\beta_i + \delta_i M_j + \varepsilon_{ij}, \tag{4.1}$$

where β_i is a vector of *individual-specific* preference parameters and $\delta_i < 0$ represents the fixed cost incurred from mobility, with M_j defined by:

$$M_j = \begin{cases} 1 & \text{if distance from current location} > 0, \\ 0 & \text{otherwise.} \end{cases} \tag{4.2}$$

An individual i makes a location choice after observing attributes $X_1, \ldots, X_J$ and $\varepsilon_i = \varepsilon_{i1}, \ldots, \varepsilon_{iJ}$ for all available locations and chooses the location with the highest utility such that i chooses location j if and only if $u_{ij} > u_{ik}$ for all $j \neq k$. We can then quantify the probability of this event occurring by assuming the ε_i's are distributed i.i.d. Type I extreme value conditional on X_j, yielding the following familiar formula for the probability of choosing location j, given the location attributes $(X_1, X_2, \ldots, X_J, M_1, \ldots, M_J)$:

$$\begin{aligned} q_{ij} =& \Pr\left(u_{ij} > u_{ik} \ \ \forall \ \ k \neq j\right), \\ =& \int \mathbf{1}\{u_{ij} > u_{ik} \ \ \forall \ \ k \neq j\} dG(\varepsilon_i) \\ =& \frac{\exp\left(X_j\beta_i + \delta_i M_j\right)}{\sum_{k=1}^{J} \exp\left(X_k\beta_i + \delta_i M_k\right)}. \end{aligned} \tag{4.3}$$

One can further assume that $\widetilde{\beta} \equiv \left[\begin{array}{cc} \beta' & \delta \end{array}\right]'$ is independent of X and M and has population density $f\left(\widetilde{\beta}\middle|\theta\right)$, where θ is the vector of parameters describing distribution function f. This yields the McFadden and Train (2000) mixed logit model and the population fraction choosing location j can be expressed as:

$$q_j = \int \frac{\exp\left(X_j\beta + \delta M_j\right)}{\sum_{k=1}^{J} \exp\left(X_k\beta + \delta M_k\right)} f\left(\widetilde{\beta}\middle|\theta\right) d\widetilde{\beta}. \tag{4.4}$$

As discussed in the previous section, we follow a new and growing literature that uses elicited choice probabilities for a set of hypothetical choice scenarios to estimate preferences. To our knowledge, ours is the first study to apply this approach to residential migration and location choice decisions. We detail our procedure in the following subsection.

4.2 Empirical model of hypothetical migration and location choice

Faced with an hypothetical choice scenario, it is assumed that individual i reports a probability of hypothetically choosing option j which can be written as:

$$q_{ij} = \int 1\left\{X_j\beta_i + \delta_i M_j + \varepsilon_{ij} > X_k\beta_i + \delta_i M_k + \varepsilon_{ik} \text{ for all } k \neq j\right\} dG_i\left(\varepsilon_i\right) \tag{4.5}$$

where $G_i\left(\varepsilon_i\right)$ represents individual i's belief about the distribution of the J elements comprising the vector ε_i. We follow Blass, Lach, and Manski (2010) and Wiswall and Zafar (2018) in interpreting ε_i as resolvable uncertainty, i.e. uncertainty at the time of data collection (about factors unspecified in the scenarios) that the individual knows will be resolved by the time an actual choice would be made. This is consistent with our hypothetical choice scenarios which specify and exogenously vary a limited set of attributes X while leaving ε_i unspecified. In our setting of incomplete scenarios (Manski, 1999), such unspecified conditions could relate directly to the specified attributes or to the state of the world at the time of a future mobility decision, which may affect the utility value of the attributes.[16] Examples of unknown conditions include the future health of household members, family members and friends, uncertainty about the exact location of the non-status-quo alternatives, about (non-wage) attributes of jobs including working hours, and uncertainty about the (local) types of crime.

We assume that beliefs about the utility from different locations $G_i\left(\cdot\right)$ in equation (4.5) are i.i.d. Type I extreme value for all individuals. The leads to the standard logit formula for the choice probabilities:

$$q_{ij} = \frac{\exp\left(X_j\beta_i + \delta_i M_j\right)}{\sum_{k=1}^{J}\exp\left(X_k\beta_i + \delta_i M_k\right)} \tag{4.6}$$

Similar to Wiswall and Zafar (2018), the variation in our hypothetical scenarios allows us to estimate the distribution of preferences, β_i, without imposing any parametric assumptions on this distribution. Taking the log odds transformation of (4.6) for each individual, gives us:

$$\ln\left(\frac{q_{ij}}{q_{ik}}\right) = \left(X_j - X_k\right)\beta_i + \delta_i\left(M_j - M_k\right), \ \forall\ j \neq k, \tag{4.7}$$

where β_i (or δ_i) is then interpreted as the marginal change in log odds due to some change in the

[16]In our hypothetical choice scenarios, we specified the location choice decision to be within the next two years from the date the respondents took the survey.

location attributes, X (or M).

As noted in the literature and shown earlier in Figure 3, survey respondents tend to round their subjective probabilities to multiples of 5% and 10%, and this is evident in our stated probabilistic choice data (see Panels (a) and (b) of Appendix Figure A4, as well as Appendix Figure A5). To combat against potential bias induced by this rounding, we follow the literature and introduce measurement error into the model and estimate preferences using the least absolute deviations (LAD) estimator. This is particularly helpful in dealing with respondents whose true subjective probabilities are close to the corner values of 0% or 100%, but who round their values to 0% or 100% exactly.[17]

We formally introduce this rounding behavior by assuming that our observed probabilities $\tilde{q}_{ij}$ are measured with error such that

$$\ln\left(\frac{\tilde{q}_{ij}}{\tilde{q}_{ik}}\right) = (X_j - X_k)\,\beta_i + \delta_i\,(M_j - M_k) + \eta_{ijk}, \;\; \forall\, j \neq k, \tag{4.8}$$

where η_{ijk} captures the (difference in) measurement errors. Assuming that the distribution of η (conditional on X) has a median of 0, we reach the following expression:

$$M\left[\ln\left(\frac{\tilde{q}_{ij}}{\tilde{q}_{ik}}\right)\right] = (X_j - X_k)\,\beta_i + \delta_i\,(M_j - M_k)\,, \;\; \forall\, j \neq k, \tag{4.9}$$

where $M[\cdot]$ is the median operator. When estimated on a sample of individuals from a given population, the parameter estimates from (4.9) will then represent the mean of the population distribution of $\widetilde{\beta} \equiv \left[\begin{array}{cc} \beta' & \delta \end{array}\right]'$.[18] When estimated just on data from a single individual, on the other hand, the parameter estimate will represent estimates of β_i and δ_i.

We estimate (4.9) by LAD, at multiple levels of aggregation. We first estimate population-level preferences and then we estimate the preferences separately for each individual. We use data on all scenarios that the individual responds to. There are three choice alternatives in each scenario, with alternative 1 representing the no-move option and alternatives 2 and 3 representing two different destination locations. Normalizing with respect to alternative 2, we have two probability ratios and two sets of differenced covariates (the $(X_j - X_k) + (M_j - M_k)$ in (4.9)) for each scenario. This gives us 32 observations per individual.[19]

[17]For a more complete analysis of rounding in self-reported subjective probabilities, see Giustinelli, Manski, and Molinari (2018).

[18]When estimating on a sample from the population, we assume a symmetric distribution of preferences with center $\widetilde{\beta}$, conditional on X. Rather than center of symmetry of the preference distribution we refer to the estimated parameter as the "mean preferences".

[19]For half of the individuals in the September wave, we only have 24 observations.

The vector of covariates is made up of attributes of each location that we experimentally vary. These attributes are: income, housing costs, crime rate, distance, a dummy for if family is living nearby, home size, moving costs, state and local income taxes, a dummy for if local cultural norms are agreeable, quality rating of local schools, a dummy variable for a local move (distance of only 0.2 miles), a dummy for the possibility of moving to an exact copy of the respondent's current home and a dummy for having to move (i.e. if choosing location j would result in having to move).[20] In each equation we also include a constant, which will capture any systematic rank-order effects in the probability assigned to alternative 3 versus alternative 2 that is unrelated to the scenarios we show the respondents (see Panels (c) and (d) of Figure A4). Finally, as in Wiswall and Zafar (2018) we use repeated observations for the same respondent across experimental scenarios to estimate preferences at the individual level, therefore recovering the distribution of preferences allowing for unrestricted forms of preference heterogeneity.

We estimate standard errors on the preference parameters by block bootstrap sampling of the choice scenarios within group where each block is all of the responses of one respondent, following Wiswall and Zafar (2018). We use 1,000 bootstrap replicates.

4.3 Benefits of a Stated Probabilistic Choice Approach

As discussed in Section 3.3, our key insight is that we experimentally manipulate the attributes of each location, while explicitly stating that all other conditions are identical across locations. Sufficient variation in the attributes across choice scenarios allows us to recover the preference parameters. We consistently estimate the preference parameters so long as the preference shocks ε_i are independent of the experimentally manipulated attributes. This holds in our context by virtue of our randomized experimental design.

At this point, it is important to reiterate several key advantages of our stated choice approach for the study of residential location decisions. First, whereas in revealed-preference data one typically does not observe the choice set the individual considered, here we actually know the pre-specified choice set of the individual. Second, we explicitly manipulate the location of family, whereas the vast majority of observational studies only loosely control for proximity to family by considering if a person lives in their state of birth.[21] Third, we observe full preference rankings with hypothetical

[20] We allow preferences to be concave in household income, by including in X the logarithm of income, thus allowing for diminishing marginal utility in income and implicitly consumption, following Wiswall and Zafar (2015). Similarly, we have a log-linear specification in crime and housing costs, but a linear specification in distance, home size, box and truck moving costs and state and local income tax rates.

[21] An exception to this is the PSID, which explicitly tracks the residence location of respondents and their parents.

data, because we elicit probabilities of choosing each location, rather than binary choices. That is, our elicited probabilities can more fully capture the latent underlying location preferences, as opposed to a simple binary indicator for whether that location has the highest utility. Fourth, our approach permits identification of the distribution of preferences under weak assumptions about the form of preference heterogeneity. In fact, as mentioned in the previous section, the data on reported choice probabilities allow us to estimate individual-specific preferences and willingness to pay for different location attributes. Note that, to identify preferences for attributes, no explicit assumptions need to be made about the equilibrium migration outcome mechanisms. Fifth, and perhaps most importantly, our approach avoids omitted-variables and endogeneity biases. That is, with observational data, a researcher only sees certain people moving to locations with certain attributes. The observed moves may be a function of other, unobservable location attributes or circumstances that in turn are likely to be correlated with the included observable attributes. Our approach resolves this bias by experimentally manipulating location characteristics, while keeping all other attributes identical across locations.

It is also important to contrast our stated probabilistic approach to the traditional stated discrete choice approach. Unlike the latter, the stated probabilistic approach allows for the existence of resolvable uncertainty. If respondents do not perceive such uncertainty to exist, as assumed in the stated discrete choice approach, they would assign a probability of 1 to one of the specified choice alternatives and 0 to all others. In our data, approximately 45% of reported probabilities across hypothetical scenarios do not match this pattern (see Appendix Figure A4), suggesting that a stated subjective probability framework is more appropriate than a stated discrete choice framework.

5 Results

In discussing estimates of the model introduced in the previous section, we first present estimates of the preference parameters for the full sample and by respondents' migration attitudes. We then interpret the estimates by computing the willingness-to-pay (WTP) implied by the preference parameter estimates for each location attribute. Finally, we discuss the heterogeneity in preferences using the individual-level preference estimates and the distributions of the implied WTPs for different demographic groups.

5.1 Location Preference Estimates

The preference estimates are reported in Table 5. Each row of the table corresponds to the mean preference estimate for each location characteristic that we vary in our experiment: income, housing costs, crime, distance, family proximity, house size, financial moving costs, taxes, cultural norms, local school quality, making a local move (i.e. moving within 0.2 miles), moving to an exact copy of the current home, and non-monetary moving costs.

Each column of Table 5 represents a separate vector of mean preference estimates for a different subgroup of our sample; for the overall sample and for the respondents who consider themselves mobile, stuck, or rooted. We follow Delavande and Manski (2015) and present estimates in Table 5 based on a sample that excludes never-movers, defined as those who assigned a probability of 1 to the no-move option in each of the scenarios considered. For this group of respondents, some 12% of our sample, we see no variation across scenarios and their moving and location choice decision appear based on different motivations, captured in infinitely large moving costs.[22] These individuals tend to be older, less educated, have lower incomes, and are much more likely to be rooted. They also appear to be less attentive respondents, spending shorter amounts of time on the survey.[23]

Overall, our parameter estimates are consistent with economic theory and findings in the literature. Preference estimates for income, proximity to family, house size, agreeability with local cultural values and norms, local school quality, and staying within a 0.2-mile radius all have positive signs. On the other hand, estimates for housing costs, crime, distance moved, financial moving costs, and local taxes have negative signs. The only estimate that is not statistically significant for the full sample, is the opportunity to move to an exact copy of the current home. However, as expected, this attribute is an important component of location choice for the respondents who identify themselves as "rooted."

The heterogeneity in the preference estimates for different attributes based on respondents' self-reported ability and willingness to move also manifests in intuitive ways. The rooted have a higher preference for living close to family, remaining in the same neighborhood/town when moving, moving to an identical copy of their current dwelling, and they have the highest psychic cost of moving. On the other hand, while these differences are not statistically significant, the stuck have a

[22] The estimates for all attributes excluding the non-monetary cost of moving, are qualitatively similar when we include non-movers in the estimation. The results from that analysis are shown in Appendix Table A9. Appendix Tables A3 and A4 show the observable characteristics of the non-movers.

[23] In Appendix Table A16, we show that respondents spend only marginally shorter amounts of time on scenarios within a block (after the first) as the survey progresses. Respondents spend the most amount of time on the first scenario of each block, which is consistent with reading about the information contained in the new block.

stronger distaste for housing costs, and agreeability with local cultural norms is a relatively more important component for their location choices compared to the other groups.

As mentioned in section 4.2, we also estimate the same model at the individual level. This allows us to get at the heterogeneity of preferences without making any assumptions on the shape of the preference distribution. Distributions for each preference parameter are shown in Appendix Table A8, for the same sample used to obtain the estimates in Table 5. The median preference estimates have the same signs and similar relative magnitudes as those in Table 5. However, the median masks substantial heterogeneity in the parameters across individuals. Interestingly, some attributes, such as an increase in square footage, are nearly equally liked and disliked. While most people prefer to be near family, a small number of people prefer to be far away from family.

5.2 Willingness-to-Pay (WTP) for Location Attributes

The parameter estimates from the previous subsection are difficult to interpret due to the model being non-linear. In order to be able to compare the importance of different attributes for location choices, we use measures of willingness-to-pay (WTP) that translate the utility difference from changing a given attribute to a difference in household income so that the individual is indifferent between accepting the income difference and choosing the location with that attribute.

Specifically, we construct the WTP for a change of Δ in a given location attribute X_j (keeping all the other attributes except for income, Y, constant) as follows:

$$\begin{aligned} u_{ij}(Y, X_j, \text{other attributes}) &= u_{ij}(Y - WTP, X_j + \Delta, \text{other attributes}) \\ \beta_y \ln(Y) + \beta_j X_j &= \beta_y \ln(Y - WTP) + \beta_j (X_j + \Delta) \\ -\beta_j \Delta &= \beta_y \ln\left(\frac{Y - WTP}{Y}\right) \\ WTP &= \underbrace{\left[1 - \exp\left(-\frac{\beta_j}{\beta_y}\Delta\right)\right]}_{\text{fraction of income}} Y \end{aligned} \tag{5.1}$$

Depending on the unit of the difference Δ, the WTPs give us a measure that is comparable across different location attributes. Moreover, the WTP measure is flexible enough to accommodate both "good" and "bad" location attributes. If X_j is a good attribute ($\beta_j > 0$), a respondent would be willing to forego some income to get more of it ($\Delta > 0$), leading to a positive WTP. On the contrary, if X_j is a bad attribute ($\beta_j < 0$), the respondent would need to be compensated to agree to have more of it ($\Delta > 0$) and this will lead to a negative WTP. Note that this interpretation assumes that income is a strictly positive determinant of location choices.[24]

The WTPs are reported in two forms: dollar amounts (evaluated at the median household income level within the subgroup as reported in the SCE), and percentage of income (the first term on the right hand side of the last formula in equation (5.1)). We consider the following values of Δ for each attribute:

- 20% increase in housing costs
- Doubling of (i.e. 100% increase in) the crime rate
- 100-mile increase in distance
- 1000-square-foot increase in home size
- $5,000 increase in financial moving costs
- 5-percentage-point increase in tax rate
- Change from 0 to 1 for dummy variables (living near family, moving to a copy of current home, making a local rather than distant move, and physically having to move)
- Increase by one unit for discrete-scaled variables (i.e. from "less" to "same" or "same" to "more" in terms of agreeableness of local cultural values and norms; quartiles of school quality)

We report our WTP estimates for persons with the mean preferences in Table 6 in dollars (evaluated at the median income level of the subgroup) and in Table 7 in percentages (as a fraction of income). We report WTP in both levels and percentages so as to separate a group's willingness to pay from a group's ability to pay because of higher incomes. For example, those above the median level of income have larger WTP than those below the median, but this difference might be precisely driven by the fact that richer households have higher income.

On the whole, our WTP estimates in large part agree with our discussion of the parameter estimates themselves. We find large non-pecuniary moving costs, and a substantial willingness to pay for living close to family, making a local rather than distant move, and for increasing the size of one's home.[25] The latter are especially large for the rooted. We also see substantial willingness to pay for better school quality and more agreeable social values and norms, and to avoid an increase in the crime rate.

[24] This assumption does not hold for 28% of our sample (excluding non-movers). In the analysis based on individual-level estimates, we exclude these individuals. Appendix Tables A5 and A6 show the characteristics of these individuals and how they compare to the rest of the sample. They tend to be older, less educated, have lower incomes, are less likely to be married or live with children, and are more likely to be rooted. They also appear to be less attentive, being more likely to have spent a short amount of time on the survey and more likely to have incorrectly answered the survey's numeracy and literacy questions.

[25] As moving is likely to entail a change in jobs, note that any disutility associated with changing jobs, even when associated with an increase in household income, will be absorbed in our moving cost estimate. We also examined differences in preferences by employment status (see Appendix Tables A13 through A15). We find that non-employed respondents display a stronger preference for having their family nearby and have higher non-monetary moving cost compared to employed respondents. The latter result is consistent with findings in Ransom (2019).

Finally, we show the distributions of individual-level heterogeneity in estimated WTPs for a subset of our attributes in Figure 4.[26] A common theme is that the WTP distributions are highly skewed. For living close to family, more agreeable norms, crime rate increase, and for moving (capturing psychic moving costs), the tail is exceptionally long. For home size there is a sizable mass on either side of zero. Next, we further analyze these individual-level WTPs by relating them to demographic characteristics. Due to the long tails in the WTPs, we will focus our analysis on the median rather than the mean.

To analyze differences by demographics in the estimated moving costs and in the WTP for different attributes, Table 8 compares the median WTPs for different attributes by gender, race, homeownership, education, age, marital status and presence of children in the household.[27] These WTPs are computed based on individual-level preference estimates. Considering first the psychological cost of moving (last row), and focusing mainly on differences that are statistically significant, we find higher median costs for homeowners (compared to renters), as well as for older and married respondents. Some other notable statistically significant differences are a higher WTP for a lower crime rate and for proximity to family by older versus younger respondents, a higher WTP for a reduction in housing costs by single versus married respondents, and a higher WTP for a local rather than longer-distance move and better quality schools by households with children.

In Table 9 we examine variation in individual non-monetary moving costs further by relating it to a number of demographic variables. As shown in the first column of the table, we find a common pattern observed in previous studies: a higher perceived cost of moving for homeowners. In the second column we see that this partly appears to reflect an age effect, while the estimates in the third column indicate that much of the higher moving costs of homeowners is in fact captured by homeowners feeling more rooted and more satisfied with their current residential location and dwelling (see also Oswald, 2019).

Returning to a key focus in this paper, our research reconfirms the existence of large average non-monetary costs ($54,000) associated with a move, but finds large heterogeneity in its estimated magnitude—varying from $23,000 for those who consider themselves mobile to $155,000 of income for those who describe themselves as rooted. It is important to note that the estimated average moving costs of $54,000 is considerably lower than those obtained in estimated dynamic models of migration, which typically estimate this number to be about five times as large. The discrepancy is

[26] The distributions for the remaining attributes are reported in Appendix Figure A2.
[27] Appendix Table A12 reports these results for WTP as a percentage of income.

likely due in part to our ability to more fully capture preferences for location and mobility attributes that are typically unobserved in observational data.[28]

Another advantage of our approach is that, unlike previous studies, we are able to distinguish the importance of community ties and attachment and satisfaction with the current dwelling from other sources of non-pecuniary costs. Our willingness to pay estimates in Table 6 indicate the importance of attachment to the current home only for the rooted in their current location.[29] They attribute a much greater role to the attachment to the local community and neighborhood. By adding the WTPs for non-pecuniary moving costs and making a local (rather than more distant) move, we can estimate the moving cost for making an intra-city move (i.e. within 0.2 miles, or within a 10 minute walk from the current home). Our estimates indicate that local community ties make up a little less than half of the non-pecuniary cost of making an intra-city move. Put differently, the fixed non-pecuniary cost of moving within one's city is \$34,000, or roughly two-thirds the cost of moving out of one's city. For the rooted, while having a greater WTP to remain in the current area, this amount is small relative to their much larger non-pecuniary cost of moving.

Beyond moving costs, our approach also helps in more fully understanding the role of family and friends in location decisions. A number of papers in the literature use residence in one's state of birth as a proxy for living near family (Gemici, 2011; Kennan and Walker, 2011; Diamond, 2016; Bartik, 2018; Ransom, 2019, and others). Our approach is able to exactly measure preferences for living near family and friends. We find that they are sizable. The median person in our sample will forego over 43% of his or her income in order to live close to family. This WTP is over 56% for the rooted, but less than 29% for the mobile. These results echo the findings of Bailey et al. (2018), who show that county-to-county migration flows are substantially larger between counties that are more socially connected, as well as the findings of Büchel et al. (2019), who show that people with fewer local contacts are more likely to move.

[28] One may argue that for policy purposes it may be sufficient to know the average overall moving cost as typically estimated in models with observational data, since amenities are bundled with moving in the real world. Our estimates do not preclude us from computing the average overall moving costs, but we are also able to assess the relative importance of the cost components. These may be relevant for evaluating policies aimed at inducing individuals to move to destinations with better-than-usual amenities (such as in "Moving to Opportunity"-type experiments). They also matter for assessing the impact of a financial moving cost subsidy, as it is the effect of this specific component of the overall moving costs that is most relevant in that case.

[29] These findings echo those of Bartik, Butler, and Liu (1992), who document a high value of remaining in their dwelling among low-income individuals.

5.3 Comparison with Traditional Stated Discrete Choice Approach

As we discussed earlier, our data clearly point to the existence of resolvable uncertainty, which implies that a stated subjective probability framework is more appropriate than a stated discrete choice approach. Now, one may nevertheless wonder whether estimates based on a stated discrete choice approach would have been very different from our estimates. The correct way to do such a comparison would have been to undertake a separate analysis where we randomize and ask one half of respondents to pick their preferred option (or choice ranking) as in a more traditional stated-choice experiment, while for the other half we elicit their choice probabilities. We can imperfectly mimic the data that a discrete choice approach would have given us by mapping our elicited probabilities into discrete choices. For example, we can pick the alternative with the highest probability and set its probability to 1 and all other probabilities to 0, or we can rank them in terms of probabilities. The mapping presumes that this is indeed the way individuals would have reported their choices in a stated choice experiment. A comparison of estimates based on these "imputed" discrete choices with those based on stated probabilities would need to presume this mapping to be correct. This is a strong assumption, as there is plenty of evidence in the literature of *procedure preference reversal*; when different methods for measuring a preference yield different results (Lichtenstein and Slovic, 1973).

When conducting such an (imperfect) comparison, we find the WTP estimates obtained from the estimated standard discrete choice model (either as the McFadden (1974) conditional logit or the rank-ordered logit or exploded logit model (Beggs, Cardell, and Hausman, 1981)) to be qualitatively similar to ours, although the WTP estimates are quantitatively different (see Appendix Table A7). This provides suggestive evidence that if one had instead adopted a stated discrete choice approach for the analysis in our paper, the findings may have been qualitatively similar but quantitatively different. As discussed in section 4.3, however, our data clearly show that a stated subjective probability framework is more appropriate than a stated discrete choice version, irrespective of the validity of the assumed data mapping.

6 Preferences and Realized and Expected Behavior

A common question raised when using data from stated choice experiments is whether preferences recovered from such data are the same as those driving actual behavior. A related issue concerns the assumed validity of subjective expectations data, in our case the probabilities of choosing to move to different locations or to not move. Starting with the latter, we exploit the SCE panel to relate subjective probabilities of moving over the next year (which has been asked each month since the survey's start in June 2013) to actual subsequent moving decisions. More specifically, we relate responses to this question asked in the first month of survey participation to the respondent's moving decisions over the next 11 months as observed in the survey.[30] Figure 5 shows a binned scatterplot and a quadratic fit of actual versus expected mobility. Reported probabilities of a change in residence over the next 12 months are highly predictive of an actual change in residence observed over the subsequent 11 months, revealing a clear monotonic increasing relationship. A similar chart based just on respondents who participated in our special September 2018 survey shows an almost identical relationship (see Figure A3 in the appendix).

We next analyze how our moving cost estimates for the September 2018 respondents relate to their moving expectations reported in the same survey. The binned scatterplot and quadratic fit shown in Figure 6 again reveals a clear monotonically increasing relationship indicating a much more (less) negative average WTP for moving—our measure of moving costs—for those reporting a low (high) probability of moving over the next 12 months. We also related estimated individual moving costs to subsequent mobility decisions observed in the SCE panel for the same respondents. Median regression estimates of the relationship between WTP for moving (the negative of moving costs) and a moving dummy, together with a set of calendar-month indicator variables (which also capture tenure-in-survey effects as well as variation in survey observation periods across respondents) yield a statistically significant estimate of 20.8%. This implies that SCE respondents who subsequently are observed to change residence have non-monetary moving costs that are lower by 20.8% of income, compared to those not observed to move. These findings indicate that our moving cost estimates appear to capture true preferences for moving.

To further investigate the extent to which hypothetical choice-based preference estimates relate to actual behavior, we relate our WTP estimates for a variety of location attributes to the values of those attributes in their current, actually chosen location. Generally, we would expect those with a high WTP for a given attribute to be more likely to be living in a place with a high value of the same attribute. As reported in Table 10 we indeed find that those with a greater preference for living near family are more likely to live near family. We similarly find a higher average willingness to pay for school quality among those living in locations with high school quality, and a greater average dislike of taxes (a more negative WTP) for those living in locations with below-average state and local

[30] SCE is a rotating panel where each participant rotates out after 12 months.

taxes. On the other hand, we find a larger median willingness to pay for an additional 1000 square feet of living space for those currently living in relatively small homes, compared to those already living in a large home. We see less evidence of preference-based sorting based on crime and social norms. In fact we see a *higher* median WTP for more agreeable cultural values and norms amongst those currently living in neighborhood with less agreeable values and norms. This, however, may reflect a greater share of those who consider themselves "stuck" in such locations, who, as reported in Table 7, have higher preferences for living in an area with more agreeable values and norms, while reporting a lower rate of agreeableness with norms in their current locations (Table 2).

Overall, the findings just discussed show a robust systematic relationship between estimated preferences and self-reported chosen location characteristics, providing evidence for sorting based on preferences. This strengthens the credibility of our approach and estimates.

7 Conclusion

In this paper, we investigate how migration and location choice decisions depend on a large set of location attributes, with particular focus on measuring the importance and nature of the non-monetary costs of moving. We do so using a stated choice approach that elicits respondents' choice probabilities for set of hypothetical location scenarios.

Many previous studies have documented substantial psychic and financial costs to moving, but little is known about the nature of these costs. We contribute to this literature by collecting novel measures of migration attitudes in a nationally representative sample of households. Our methodology allows us to unpack the black box of non-pecuniary moving costs and can do so in a way that is free of selection bias and omitted variables bias. We validate our results by showing a strong, systematic relation between estimated preferences and actual mobility behavior and location choices.

We find substantial estimated moving costs which, at roughly 100% of annual household income, are smaller than in other studies. There is also substantial heterogeneity in these moving costs, with those who consider themselves "rooted" having much larger costs (230% of income) than those who classify themselves as "mobile" (34%). We also find strong preference for family proximity, which individuals value at 43% of income, on average.

Our results imply that moving costs have a strong social dimension. Because moving costs are so large and moving decisions are family-oriented, this suggests a role for place-based policies as a tool for revitalizing struggling areas (Bartik, 2019). Our findings of strong preferences for family and large psychic moving costs among the "rooted" also tie into existing explanations of the long-run decline in migration (see for example Mangum and Coate, 2018, who document a secular increase in rootedness). Specifically, our results indicate that changes in the level of rootedness of the population will drive down gross migration rates, and that family in turn can act as a migration spillover: When your sibling, parent or child is less likely to move, you are less likely to move yourself, which in turn will make them less likely to move. Therefore, a secular decline in migration will be amplified due to individuals' preference for living near family.

References

Ameriks, John, Joseph Briggs, Andrew Caplin, Matthew Shapiro, and Christopher Tonetti. Forthcoming. "Long-Term-Care Utility and Late-in-Life Saving." *Journal of Political Economy* . 7

Arcidiacono, Peter, V. Joseph Hotz, and Songman Kang. 2012. "Modeling College Major Choices Using Elicited Measures of Expectations and Counterfactuals." *Journal of Econometrics* 166 (1):3–16. 8

Armantier, Olivier, Giorgio Topa, Wilbert van der Klaauw, and Basit Zafar. 2017. "An Overview of the Survey of Consumer Expectations." *Economic Policy Review* 23 (2):51–72. 9, 10

Armona, Luis, Andreas Fuster, and Basit Zafar. 2018. "Home Price Expectations and Behaviour: Evidence from a Randomized Information Experiment." *Review of Economic Studies* 86 (4):1371–1410. 8

Bailey, Michael, Rachel Cao, Theresa Kuchler, Johannes Stroebel, and Arlene Wong. 2018. "Social Connectedness: Measurement, Determinants, and Effects." *Journal of Economic Perspectives* 32 (3):259–280. 14, 25

Bajari, Patrick and Matthew E. Kahn. 2005. "Estimating Housing Demand With an Application to Explaining Racial Segregation in Cities." *Journal of Business & Economic Statistics* 23 (1):20–33. 3

Baker, Rachel, Eric Bettinger, Brian Jacob, and Ioana Marinescu. 2018. "The Effect of Labor Market Information on Community College Students' Major Choice." *Economics of Education Review* 65:18–30. 8

Baláž, Vladimir, Allan M. Williams, and Elena Fifeková. 2016. "Migration Decision Making as Complex Choice: Eliciting Decision Weights Under Conditions of Imperfect and Complex Information Through Experimental Methods." *Population, Space and Place* 22 (1):36–53. 2, 5

Bartel, Ann P. 1979. "The Migration Decision: What Role Does Job Mobility Play?" *American Economic Review* 69 (5):775–786. 3

Bartik, Alexander W. 2018. "Moving Costs and Worker Adjustment to Changes in Labor Demand: Evidence from Longitudinal Census Data." Working paper, University of Illinois at Urbana-Champaign. 25

Bartik, Timothy J. 2019. "Should Place-Based Jobs Policies Be Used to Help Distressed Communities?" Working Paper 19-308, Upjohn Institute. 29

Bartik, Timothy J., J.S. Butler, and Jin-Tan Liu. 1992. "Maximum Score Estimates of the Determinants of Residential Mobility: Implications for the Value of Residential Attachment and Neighborhood Amenities." *Journal of Urban Economics* 32 (2):233–256. 5, 14, 25

Bayer, Christian and Falko Juessen. 2012. "On the Dynamics of Interstate Migration: Migration Costs and Self-selection." *Review of Economic Dynamics* 15 (3):377–401. 2, 3, 5

Bayer, Patrick, Fernando Ferreira, and Robert McMillan. 2007. "A Unified Framework for Measuring Preferences for Schools and Neighborhoods." *Journal of Political Economy* 115 (4):588–638. 3

Bayer, Patrick, Nathaniel Keohane, and Christopher Timmins. 2009. "Migration and Hedonic Valuation: The Case of Air Quality." *Journal of Environmental Economics and Management* 58 (1):1–14. 3

Bayer, Patrick, Robert McMillan, Alvin Murphy, and Christopher Timmins. 2016. "A Dynamic Model of Demand for Houses and Neighborhoods." *Econometrica* 84 (3):893–942. 2, 3, 5, 14

Beaudry, Paul, David A Green, and Benjamin M Sand. 2014. "Spatial Equilibrium with Unemployment and Wage Bargaining: Theory and Estimation." *Journal of Urban Economics* 79:2–19. 5, 6

Beggs, S. D., Nicholas S. Cardell, and Jerry Hausman. 1981. "Assessing the Potential Demand for Electric Cars." *Journal of Econometrics* 17 (1):1–19. 26

Blanchard, Olivier and Lawrence F. Katz. 1992. "Regional Evolutions." *Brookings Papers on Economic Activity* 1992 (1):1–75. 6

Blass, Asher A., Saul Lach, and Charles F. Manski. 2010. "Using Elicited Choice Probabilities to Estimate Random Utility Models: Preferences for Electricity Reliability." *International Economic Review* 51 (2):421–440. 3, 4, 7, 13, 17

Bleemer, Zachary and Basit Zafar. 2018. "Intended College Attendance: Evidence From an Experiment on College Returns and Costs." *Journal of Public Economics* 157:184–211. 8

Bogart, William T. and Brian A. Cromwell. 2000. "How Much Is a Neighborhood School Worth?" *Journal of Urban Economics* 47 (2):280–305. 3

Borjas, George J. 1999. "Immigration and Welfare Magnets." *Journal of Labor Economics* 17 (4):607–637. 11

Boyer, Martin, Philippe De Donder, Claude Fluet, Marie-Louise Leroux, and Pierre-Carl Michaud. 2017. "Long-Term Care Insurance: Knowledge Barriers, Risk Perception and Adverse Selection." Working Paper 23918, National Bureau of Economic Research. 7

Büchel, Konstantin, Diego Puga, Elisabet Viladecans-Marsal, and Maximilian von Ehrlich. 2019. "Calling from the Outside: The Role of Networks in Residential Mobility." Discussion Paper DP13615, CEPR. 14, 25

Cecere, Grazia, Nicoletta Corrocher, and Marco Guerzoni. 2018. "Price or Performance? a Probabilistic Choice Analysis of the Intention to Buy Electric Vehicles in European Countries." *Energy Policy* 118:19–32. 8

Cullen, Julie Berry and Steven D. Levitt. 1999. "Crime, Urban Flight, and the Consequences for Cities." *Review of Economics and Statistics* 81 (2):159–169. 3

Dahl, Gordon B. 2002. "Mobility and the Return to Education: Testing a Roy Model with Multiple Markets." *Econometrica* 70 (6):2367–2420. 3

Dahl, Michael S. and Olav Sorenson. 2010. "The Social Attachment to Place." *Social Forces* 89 (2):633–658. 14

David, Quentin, Alexandre Janiak, and Etienne Wasmer. 2010. "Local Social Capital and Geographical Mobility." *Journal of Urban Economics* 68 (2):191–204. 14

Davies, Paul S., Michael J. Greenwood, and Haizheng Li. 2001. "A Conditional Logit Approach to US State-to-State Migration." *Journal of Regional Science* 41 (2):337–360. 2, 5, 15

de Bekker-Grob, Esther W., Bas Donkers, Marcel F. Jonker, and Elly A. Stolk. 2015. "Sample Size Requirements for Discrete-Choice Experiments in Healthcare: A Practical Guide." *Patient* 8 (5):373–384. 15

Delavande, Adeline. 2014. "Probabilistic Expectations in Developing Countries." *Annual Review of Economics* 6 (1):1–20. 7

Delavande, Adeline and Charles F. Manski. 2015. "Using Elicited Choice Probabilities in Hypothetical Elections to Study Decisions to Vote." *Electoral Studies* 38:28–37. 7, 21

Delavande, Adeline and Basit Zafar. 2019. "University Choice: The Role of Expected Earnings, Nonpecuniary Outcomes, and Financial Constraints." *Journal of Political Economy* 127 (5):2343–2393. 8

Diamond, Rebecca. 2016. "The Determinants and Welfare Implications of US Workers' Diverging Location Choices by Skill: 1980-2000." *American Economic Review* 106 (3):479–524. 25

Falck, Oliver, Alfred Lameli, and Jens Ruhose. 2018. "Cultural Biases in Migration: Estimating Non-Monetary Migration Costs." *Papers in Regional Science* 97 (2):411–438. 14

Florida, Richard. 2009. *Who's Your City?: How the Creative Economy Is Making Where to Live the Most Important Decision of Your Life*. Basic Books. 2, 10

Foote, Christopher L. and Paul S. Willen. 2018. "Mortgage-Default Research and the Recent Foreclosure Crisis." *Annual Review of Financial Economics* 10:59–100. 6

Fuster, Andreas and Basit Zafar. 2015. "The Sensitivity of Housing Demand to Financing Conditions: Evidence from a Survey." Staff Report 702, Federal Reserve Bank of New York. URL `https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr702.pdf`. 7

Gemici, Ahu. 2011. "Family Migration and Labor Market Outcomes." Working paper, New York University. 3, 25

Giulietti, Corrado and Jackline Wahba. 2013. "Welfare Migration." In *International Handbook on the Economics of Migration*, vol. 1, edited by Amelie F. Constant and Klaus F. Zimmermann, chap. 26. Elgar, 489–504. 11

Giustinelli, Pamela, Charles F. Manski, and Francesca Molinari. 2018. "Tail and Center Rounding of Probabilistic Expectations in the Health and Retirement Study." Working Paper 24559, National Bureau of Economic Research. 18

Greenwood, Michael J. 1975. "Research on Internal Migration in the United States: A Survey." *Journal of Economic Literature* 13 (2):397–433. 14

Han, Lu and William C. Strange. 2015. "The Microstructure of Housing Markets: Search, Bargaining, and Brokerage." In *Handbook of Regional and Urban Economics*, vol. 5, edited by Gilles Duranton, J. Vernon Henderson, and William Strange. Elsevier, 813–886. 6

Hanson, Gordon H. 2010. "International Migration and the Developing World." In *Handbook of Development Economics*, vol. 5, edited by Dani Rodrik and Mark Rosenzweig. Elsevier, 4363–4414. 5

Johnston, Robert J., Kevin J. Boyle, Wiktor (Vic) Adamowicz, Jeff Bennett, Roy Brouwer, Trudy Ann Cameron, W. Michael Hanemann, Nick Hanley, Mandy Ryan, Riccardo Scarpa, Roger Tourangeau, and Christian A. Vossler. 2017. "Contemporary Guidance for Stated Preference Studies." *Journal of the Association of Environmental and Resource Economists* 4 (2):319–405. 12

Juster, F. Thomas. 1966. "Consumer Buying Intentions and Purchase Probability: An Experiment in Survey Design." *Journal of the American Statistical Association* 61 (315):658–696. 7

Kaplan, Greg and Sam Schulhofer-Wohl. 2012. "Interstate Migration Has Fallen Less Than You Think: Consequences of Hot Deck Imputation in the Current Population Survey." *Demography* 49 (3):1061–1074. 2

Kennan, John and James R. Walker. 2010. "Wages, Welfare Benefits and Migration." *Journal of Econometrics* 156 (1):229–238. 5, 11

———. 2011. "The Effect of Expected Income on Individual Migration Decisions." *Econometrica* 79 (1):211–251. 2, 3, 5, 25

Kesternich, Iris, Florian Heiss, Daniel McFadden, and Joachim Winter. 2013. "Suit the Action to the Word, the Word to the Action: Hypothetical Choices and Real Decisions in Medicare Part D." *Journal of Health Economics* 32 (6):1313–1324. 7

Kimball, Miles S. and Matthew D. Shapiro. 2010. "Labor Supply: Are the Income and Substitution Effects Both Large or Both Small?" Working paper, University of Michigan. URL `http://www-personal.umich.edu/~shapiro/papers/labor-29jun2010-for-www.pdf`. 7

Kuhfeld, Warren F., Randall D. Tobias, and Mark Garratt. 1994. "Efficient Experimental Design with Marketing Research Applications." *Journal of Marketing Research* 31 (4):545–557. 13, 15

Lagakos, David, Ahmed Mushfiq Mobarak, and Michael E. Waugh. 2018. "The Welfare Effects of Encouraging Rural-Urban Migration." Working Paper 24193, National Bureau of Economic Research. 2, 5, 7

Lancsar, Emily and Jordan Louviere. 2008. "Conducting Discrete Choice Experiments to Inform Healthcare Decision Making." *Pharmacoeconomics* 26:661–677. 12

Laufer, Steven. 2018. "Equity Extraction and Mortgage Default." *Review of Economic Dynamics* 28:1–33. 6

Lichtenstein, Sarah and Paul Slovic. 1973. "Response-induced Reversals of Preference in Gambling: An Extended Replication in Las Vegas." *Experimental Psychology* 101 (1):16–20. 26

Louviere, Jordan J., David A. Hensher, Joffre D. Swait, and Wiktor Adamowicz. 2000. *Design of Choice Experiments.* Cambridge University Press, 111–137. 12

Low, David. 2020. "Mortgage Default with Positive Equity." Unpublished manuscript, Consumer Financial Protection Bureau. 6

Maestas, Nicole, Kathleen J. Mullen, David Powell, Till von Wachter, and Jeffrey B. Wenger. 2018. "The Value of Working Conditions in the United States and Implications for the Structure of Wages." Working Paper 25204, National Bureau of Economic Research. 7

Mangum, Kyle and Patrick Coate. 2018. "Fast Locations and Slowing Labor Mobility." Research Paper 18-05, Andrew Young School of Policy Studies. 29

Manski, Charles F. 1999. "Analysis of Choice Expectations in Incomplete Scenarios." *Journal of Risk and Uncertainty* 1:49–66. 7, 17

———. 2004. "Measuring Expectations." *Econometrica* 72 (5):1329–1376. 7

Mas, Alexandre and Amanda Pallais. 2017. "Valuing Alternative Work Arrangements." *American Economic Review* 107 (12):3722–3759. 7

McFadden, Daniel. 1974. "Conditional Logit Analysis of Qualitative Choice Behavior." In *Frontiers in Econometrics*, edited by Paul Zarembka. Academic Press, New York, 105–142. 26

———. 1978. "Modelling the Choice of Residential Location." In *Spatial Interaction Theory and Planning Models*, edited by Anders Karlqvist, Lars Lundqvist, Folke Snickers, and Jörgen W. Weibull. Amsterdam: North Holland, 75–96. 15

McFadden, Daniel and Kenneth Train. 2000. "Mixed MNL Models for Discrete Response." *Journal of Applied Econometrics* 15 (5):447–470. 16

Molloy, Raven, Christopher L. Smith, and Abigail Wozniak. 2011. "Internal Migration in the United States." *Journal of Economic Perspectives* 25 (3):173–196. 2

Morita, Tamaki and Shunsuke Managi. 2015. "Consumers' Willingness to Pay for Electricity after the Great East Japan Earthquake." *Economic Analysis and Policy* 48:82–105. 7

Nechyba, Thomas J. and Robert P. Strauss. 1998. "Community Choice and Local Public Services: A Discrete Choice Approach." *Regional Science and Urban Economics* 28 (1):51–73. 3

Oswald, Florian. 2019. "The Effect of Homeownership on the Option Value of Regional Migration." *Quantitative Economics* 10 (4):1453–1493. 24

Potter, Simon M., Marco Del Negro, Giorgio Topa, and Wilbert van der Klaauw. 2017. "The Advantages of Probabilistic Survey Questions." *Review of Economic Analysis* 9 (1):1–32. 7

Quigley, John M. 1976. "Housing Demand in the Short Run: An Analysis of Polytomous Choice." In *Explorations in Economic Research*, vol. 3, edited by National Bureau of Economic Research. Boston: National Bureau of Economic Research, 76–102. 3

———. 1985. "Consumer Choice of Dwelling, Neighborhood and Public Services." *Regional Science and Urban Economics* 15 (1):41–63. 3

Rabin, Matthew. 1998. "Psychology and Economics." *Journal of Economic Literature* 36 (1):11–46. URL `http://www.jstor.org/stable/2564950`. 12

Ransom, Tyler. 2019. "Labor Market Frictions and Moving Costs of the Employed and Unemployed." Discussion Paper 12139, IZA. 23, 25

Rapaport, Carol. 1997. "Housing Demand and Community Choice: An Empirical Analysis." *Journal of Urban Economics* 42 (2):243–260. 3

Ruder, Alexander I. and Michelle Van Noy. 2017. "Knowledge of Earnings Risk and Major Choice: Evidence From an Information Experiment." *Economics of Education Review* 57 (1):80–90. 8

Ruggles, Steven, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas, and Matthew Sobek. 2019. *IPUMS USA: Version 9.0 [dataset]*. Minneapolis, MN: IPUMS. 38

Sampson, Robert J. and John D. Wooldredge. 1986. "Evidence that High Crime Rates Encourage Migration away from Central Cities." *Sociology and Social Research* 70 (4):310–314. 14

Schweri, Juerg and Joop Hartog. 2017. "Do Wage Expectations Predict College Enrollment? Evidence From Healthcare." *Journal of Economic Behavior & Organization* 141:135–150. 8

Shoyama, Kikuko, Shunsuke Managi, and Yoshiki Yamagata. 2013. "Public Preferences for Biodiversity Conservation and Climate-Change Mitigation: A Choice Experiment Using Ecosystem Services Indicators." *Land Use Policy* 34:282–293. 7

Sjaastad, Larry A. 1962. "The Costs and Returns of Human Migration." *Journal of Political Economy* 70 (5, Part 2):80–93. 6

Stinebrickner, Ralph and Todd Stinebrickner. 2014. "Academic Performance and College Dropout: Using Longitudinal Expectations Data to Estimate a Learning Model." *Journal of Labor Economics* 32 (3):601–644. 8

Tunali, Insan. 2000. "Rationality of Migration." *International Economic Review* 41 (4):893–920. 3

van Ooijen, Raun, Jochem de Bresser, and Marike Knoef. 2019. "Preferences for Long-Term Care Services: Bequests, Informal Care and Health Expectations." Working paper, Tilburg University. URL https://research.tilburguniversity.edu/en/publications/preferences-for-long-term-care-services-bequests-informal-care-an. 7

Van Soest, Arthur and Hana Vonkova. 2014. "How Sensitive Are Retirement Decisions to Financial Incentives? a Stated Preference Analysis." *Journal of Applied Econometrics* 29 (2):246–264. 7

Watson, Verity, Frauke Becker, and Esther de Bekker-Grob. 2017. "Discrete Choice Experiment Response Rates: A Meta-Analysis." *Health Economics* 26 (6):810–817. 12

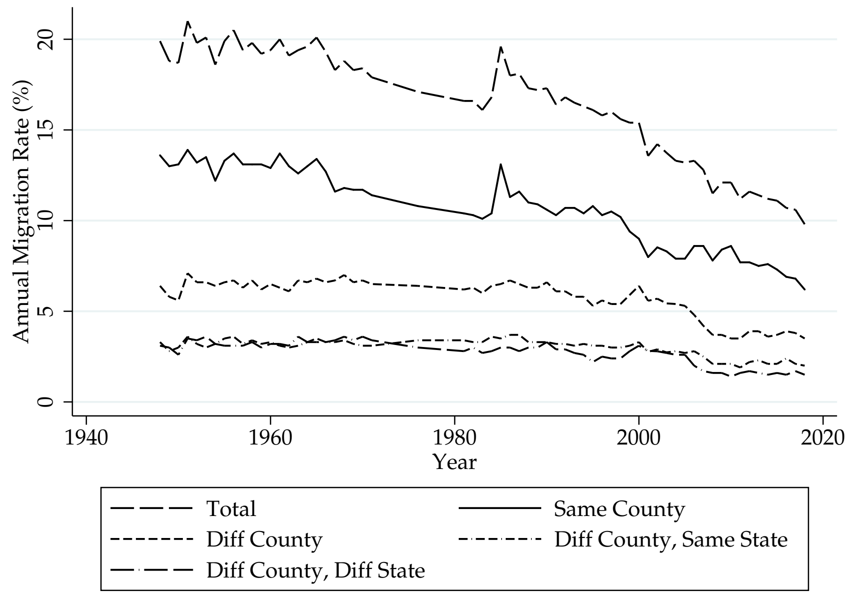
Wiswall, Matthew and Basit Zafar. 2015. "Determinants of College Major Choice: Identification using an Information Experiment." *Review of Economic Studies* 82 (2):791–824. 8, 19

———. 2018. "Preference for the Workplace, Investment in Human Capital, and Gender." *Quarterly Journal of Economics* 133 (1):457–507. 3, 4, 7, 8, 17, 19

Young, H. Peyton. 2015. "The Evolution of Social Norms." *Annual Review of Economics* 7 (1):359–387. 14

Figures and Tables

Figure 1: Long-run trends in geographic migration in the United States



Source: US Census Bureau Current Population Survey (CPS). Mover rate measures share of U.S. residents age 1 and older whose place of residence in March was different from the place of residence one year earlier. https://www.census.gov/data/tables/time-series/demo/geographic-mobility/historic.html

Figure 2: Sample scenarios from December 2019 wave

Case 3. Suppose that you [and your household] were approached by someone who wanted to buy your home and offered a few different opportunities for you to move over the next two years. In addition to paying the fair price for your house, the buyer would pay for all moving expenses as well as a subsidy described below. [if own; Assume that, if you were to move, you would be able to sell your current primary residence today and pay off your outstanding mortgage (if you have one)].

In each of the 4 scenarios below, you will be shown three locations to live in where each is characterized by:

- *Distance between this location and the current location (exact same location; different neighborhood within 10 minutes walk; location 200 miles away)*
- *Home type [an exact copy of current home; a different home]*
- *A permanent annual subsidy for selling your current home, computed as a percentage of your current household income*

Note that even if the home type in the new location is an exact copy of your current home, you will need to move all your belongings out of your current home to the new home. Suppose that the locations are otherwise identical in all aspects to your current location, including the cost of housing.

In each scenario, you are given a choice among three neighborhoods and you will be asked for the percent chance (or chances out of 100) of choosing each. The chance of each alternative should be a number between 0 and 100 and the chances given to the three alternatives should add up to 100.
Scenario 1

Neighborhood	**Distance (miles) from current location**	**Home type**	**Subsidy as a percentage of current income**
A (not move)	0	Your current home	0
B	0.2	Exact copy of your current home	5%
C	200	A different home	15%

What is the percent chance that you choose to live in each neighborhood? [answers need to add to 100]
A ____ percent chance
B ____ percent chance
C ____ percent chance

Scenario 2

Neighborhood	**Distance (miles) from current location**	**Home type**	**Subsidy as a percentage of current income**
A (not move)	0	Your current home	0
B	200	Exact copy of your current home	25%
C	200	A different home	50%

What is the percent chance that you choose to live in each neighborhood? [answers need to add to 100]
A ____ percent chance
B ____ percent chance
C ____ percent chance

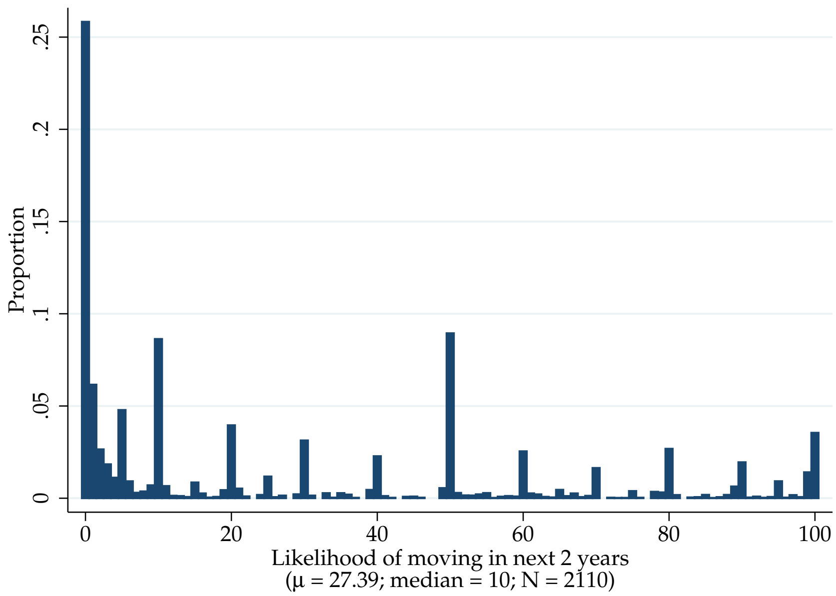
Table 1: Characteristics of SCE sample compared to 2017 ACS

Variable	SCE Mean	ACS Mean
Female	0.48	0.50
White	0.77	0.67
Black	0.09	0.12
Hispanic	0.09	0.13
Asian	0.03	0.05
Age	51.93	52.17
	(15.51)	(17.17)
	[18 , 96]	[18 , 96]
Married	0.62	0.48
Lives with children	0.42	0.39
College graduate	0.35	0.35
Owns home	0.70	0.64
Healthy	0.51	—
Income ($1,000)	77.02	69.70
	(58.81)	(49.03)
	[5 , 225]	[5 , 225]
Lives near family	0.75	—
Pr(move) in next two years	0.27	—
	(0.32)	(—)
	[0 , 1]	[— , —]
Moved during previous year	0.15	0.13
Years lived in current residence	12.24	—
	(12.03)	(—)
	[0 , 77]	[— , —]
Prior to moving to current residence:		
Lived in same county	0.62	0.62
Lived in same state, diff county	0.20	0.18
Lived in different state	0.16	0.16
Lived in different country	0.01	0.03
Lives in city	0.21	0.25
Lives in suburb	0.41	0.56
Lives in Northeast	0.18	0.18
Lives in Midwest	0.22	0.22
Lives in South	0.37	0.38
Mobile	0.36	—
Stuck	0.12	—
Rooted	0.52	—
N	2,110	1,243,544

Sources: Survey of Consumer Expectations collected in September 2018 and December 2019, and 2017 American Community Survey (Ruggles et al., 2019).

Notes: Statistics are weighted using the weights provided by each survey. Standard deviation listed below continuous variables in parentheses. Minimum and maximum listed below continuous variables in brackets. ACS sample consists of household heads ages 18–96 to match the SCE age ranges. Income in both surveys is total household income from all sources. In the ACS, income is computed conditional on $5,000–$225,000 to match the SCE range. ACS migration distance uses PUMAs instead of counties. ACS urbanicity is computed only using households whose urbanicity is known. For further details, see Section 3.

Figure 3: Distribution of 2-year migration expectations, any distance



Note: Bars represent the proportion of people who report a given likelihood of moving sometime within the next two years.

Source: Survey of Consumer Expectations collected in September 2018 and December 2019. For details, see Section 3.

Table 2: Average Characteristics of Mobile, Stuck, and Rooted

Variable	Mobile	Stuck	Rooted	Total
Female	0.46	0.54*	0.48	0.48
White	0.71*	0.73*	0.82	0.77
Black	0.13*	0.11*	0.05	0.09
Hispanic	0.09	0.10	0.08	0.09
Asian	0.04*	0.03	0.02	0.03
Age	48.37*	49.13*	55.07	51.93
Married	0.61*	0.57	0.64	0.62
Lives with children	0.42	0.54*	0.40	0.42
College graduate	0.39*	0.24*	0.35	0.35
Owns home	0.65*	0.51*	0.78	0.70
Healthy	0.55*	0.34	0.51	0.51
Income ($1000)	83.71*	54.09*	77.88	77.02
Lives near family	0.69*	0.74	0.79	0.75
Rates current norms as agreeable	0.55*	0.40*	0.71	0.61
Pr(move) in next two years	0.42*	0.35*	0.15	0.27
Moved during previous year	0.21*	0.17	0.11	0.15
Years lived in current residence	9.84*	11.70*	14.03	12.24
Prior to moving to current residence:				
Lived in same county	0.57*	0.65	0.66	0.62
Lived in same state, diff county	0.23*	0.19	0.18	0.20
Lived in different state	0.18*	0.15	0.15	0.16
Lived in different country	0.01	0.00	0.00	0.01
Lives in city	0.23*	0.28*	0.19	0.21
Lives in suburb	0.43*	0.37	0.40	0.41
Lives in Northeast	0.18	0.23*	0.18	0.18
Lives in Midwest	0.21	0.17*	0.25	0.22
Lives in South	0.36*	0.31*	0.38	0.37
Sample size	808	231	1,071	2,110

Source: Survey of Consumer Expectations collected in September 2018 and December 2019.

Notes: * indicates significantly different from Rooted at the 5% level. For further details, see Section 3 and notes to Table 1.

Table 3: Most common reasons to not move (%)

Reason	All	Mobile	Stuck	Rooted
Like current home	73	63	53	87
Like neighborhood and climate	52	38	38	69
Can't afford to buy home in places I want to move	49	51	75	39
Closeness to family and friends	47	39	39	56
Can't afford high cost of moving	38	37	64	31
Like my current job	36	39	23	37
Worry about crime rates in other locations	31	31	37	29
Hard to find job elsewhere	23	25	33	18
Hard for spouse to find job elsewhere	22	24	35	16
Good quality of local schools	21	21	20	22
Very involved in community/church–share values	21	13	9	32
Locked in low mortgage rate	20	19	14	23
Difficult to qualify for new mortgage	19	18	36	14
May lose Medicaid coverage if I move to another state	13	13	19	11
Am not licensed to work in other states	8	9	11	7
May lose or receive fewer welfare benefits	8	9	14	5
Sample size	1,147	458	142	547

Source: Survey of Consumer Expectations collected in January 2018.
Note: Numbers are percentages of respondents who listed the reason as very important or extremely important. For details, see Section 3.

Table 4: Most common reasons to move (%)

Reason	All	Mobile	Stuck	Rooted
To be in a more desirable neighborhood or climate	33	42	39	22
To reduce housing costs	30	35	41	22
To be closer to family and friends	29	34	28	25
To be in a safer neighborhood	28	34	39	19
To upgrade to a larger/better quality home	26	34	34	17
A new job or job transfer	18	27	19	9
Better access to amenities (restaurants, theaters, etc.)	18	24	19	12
To be in better school district/access to better schools	17	22	24	10
A new job or job transfer of spouse/partner	16	24	16	9
Don't like my current home	17	19	20	13
Change in household composition	17	17	24	14
Cultural values	15	20	19	9
To reduce commuting time to work/school	13	18	13	9
To look for a job	10	15	15	5
May gain Medicaid coverage if I move to another state	7	10	10	4
May gain or receive more welfare benefits	5	6	5	3
Sample size	1,147	458	142	547

Source: Survey of Consumer Expectations collected in January 2018.
Note: Numbers are percentages of respondents who listed the reason as very important or extremely important. For details, see Section 3.

Table 5: Choice model estimates

Characteristic	(1) all	(2) mobile	(3) stuck	(4) rooted
Income	3.758***	4.000***	3.873***	5.163***
	(0.182)	(0.272)	(0.626)	(0.186)
Housing costs	-0.799***	-0.888***	-0.950	-0.755***
	(0.100)	(0.233)	(0.615)	(0.224)
Crime	-0.641***	-0.695***	-0.623***	-0.684***
	(0.036)	(0.062)	(0.110)	(0.097)
Distance	-0.055***	-0.060***	-0.050***	-0.067***
	(0.006)	(0.008)	(0.013)	(0.006)
Family nearby	2.132***	1.366***	1.751***	4.262***
	(0.115)	(0.113)	(0.269)	(0.169)
House square footage	0.636***	0.407*	0.655***	0.615***
	(0.037)	(0.217)	(0.241)	(0.072)
Financial moving costs	-0.040***	-0.041***	-0.043***	-0.022**
	(0.004)	(0.009)	(0.010)	(0.010)
Taxes	-0.040***	-0.044***	-0.051*	-0.042***
	(0.003)	(0.011)	(0.027)	(0.003)
Local cultural norms	0.154***	0.173***	0.258*	0.126***
	(0.016)	(0.051)	(0.156)	(0.022)
Local school quality	0.239***	0.272***	0.266***	0.253***
	(0.029)	(0.047)	(0.085)	(0.033)
Move within school district	1.697***	0.742***	1.419***	3.548***
	(0.121)	(0.097)	(0.259)	(0.233)
Exact copy of current home	0.110	0.062	-0.002	1.024***
	(0.087)	(0.084)	(0.261)	(0.143)
Nonpecuniary moving costs	-2.579***	-1.171***	-1.802***	-6.154***
	(0.122)	(0.102)	(0.270)	(0.148)
Constant	-0.034	-0.048	-0.015	0.083***
	(0.021)	(0.035)	(0.042)	(0.028)
Observations	55,608	23,576	6,056	25,976
Individual-Scenarios	27804	11788	3028	12988
Individuals	1861	782	206	873

Notes: Distance is measured in 100s of miles. Income, housing costs, and crime are measured in percentage terms. Financial moving costs are measured in 1000s of dollars. House size is in 1000s of square feet. Family, moving within school district, living in an exact copy of the current home, and non-pecuniary moving costs are dummy variables. Cultural norms measure movement from "same" to "more agreeable" or from "less agreeable" to "same." School quality measures movement up one quartile of the distribution. Clustered bootstrapped standard errors (1000 replicates) in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Neighborhood choice WTP estimates (dollars)

Characteristic	(1) all	(2) mobile	(3) stuck	(4) rooted
Housing costs	-2,173***	-2,789***	-2,057*	-1,824***
	(263)	(723)	(1,200)	(530)
Crime	-6,898***	-8,636***	-5,306***	-6,496***
	(237)	(679)	(630)	(908)
Distance	-810***	-1,014***	-589***	-883***
	(87)	(122)	(127)	(69)
Family nearby	23,811***	19,531***	16,370***	37,930***
	(884)	(1,132)	(1,563)	(1,300)
House square footage	8,563***	6,525*	7,006***	7,584***
	(267)	(3,442)	(2,314)	(729)
Financial moving costs	-2,983***	-3,525***	-2,595***	-1,472**
	(288)	(777)	(516)	(678)
Taxes	-3,031***	-3,834***	-3,047*	-2,804***
	(162)	(913)	(1,689)	(189)
Local cultural norms	2,213***	2,862***	2,905*	1,631***
	(204)	(817)	(1,520)	(258)
Local school quality	3,385***	4,442***	2,991***	3,222***
	(386)	(711)	(821)	(360)
Move within school district	19,990***	11,425***	13,803***	33,547***
	(1,200)	(1,343)	(2,099)	(1,853)
Exact copy of current home	1,589	1,037	-21	12,147***
	(1,224)	(1,422)	(3,119)	(1,534)
Nonpecuniary moving costs	-54,252***	-22,961***	-26,671***	-154,803***
	(3,481)	(2,355)	(4,973)	(11,945)
Observations	55,608	23,576	6,056	25,976
Individual-Scenarios	27804	11788	3028	12988
Individuals	1861	782	206	873

Notes: WTP figures respectively correspond to the following units: 20% increase in housing costs, doubling of crime rate, 100 miles distance, 1000 sq ft increase in house size, \$5,000 "box and truck" moving costs, 5 percentage point increase in income tax rate, norms being "more agreeable," school quality increasing by one quartile, moving 0.2 miles away, moving into exactly the same home as current residence, and moving at all. Clustered bootstrapped standard errors (1000 replicates) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

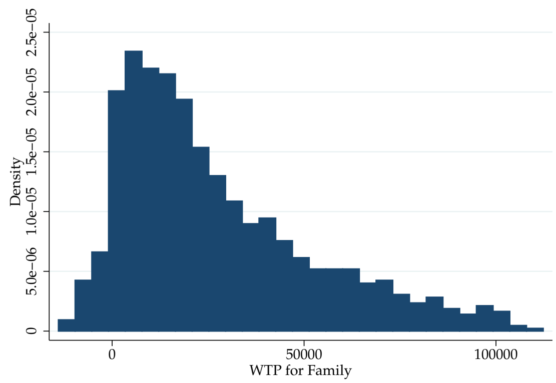
Table 7: Neighborhood choice WTP estimates (percentage of income)

Characteristic	(1) all	(2) mobile	(3) stuck	(4) rooted
Housing costs	-3.95***	-4.13***	-4.57*	-2.70***
	(0.48)	(1.07)	(2.67)	(0.79)
Crime	-12.54***	-12.79***	-11.79***	-9.62***
	(0.43)	(1.01)	(1.40)	(1.35)
Distance	-1.47***	-1.50***	-1.31***	-1.31***
	(0.16)	(0.18)	(0.28)	(0.10)
Family nearby	43.29***	28.93***	36.38***	56.19***
	(1.61)	(1.68)	(3.47)	(1.93)
House square footage	15.57***	9.67*	15.57***	11.24***
	(0.49)	(5.10)	(5.14)	(1.08)
Financial moving costs	-5.42***	-5.22***	-5.77***	-2.18**
	(0.52)	(1.15)	(1.15)	(1.01)
Taxes	-5.51***	-5.68***	-6.77*	-4.15***
	(0.29)	(1.35)	(3.75)	(0.28)
Local cultural norms	4.02***	4.24***	6.46*	2.42***
	(0.37)	(1.21)	(3.38)	(0.38)
Local school quality	6.16***	6.58***	6.65***	4.77***
	(0.70)	(1.05)	(1.82)	(0.53)
Move within school district	36.35***	16.93***	30.67***	49.70***
	(2.18)	(1.99)	(4.66)	(2.75)
Exact copy of current home	2.89	1.54	-0.05	18.00***
	(2.23)	(2.11)	(6.93)	(2.27)
Nonpecuniary moving costs	-98.64***	-34.02***	-59.27***	-229.34***
	(6.33)	(3.49)	(11.05)	(17.70)
Observations	55,608	23,576	6,056	25,976
Individual-Scenarios	27804	11788	3028	12988
Individuals	1861	782	206	873

Notes: WTP figures respectively correspond to the following units: 20% increase in housing costs, doubling of crime rate, 100 miles distance, 1000 sq ft increase in house size, $5,000 "box and truck" moving costs, 5 percentage point increase in income tax rate, norms being "more agreeable," school quality increasing by one quartile, moving 0.2 miles away, moving into exactly the same home as current residence, and moving at all. Clustered bootstrapped standard errors (1000 replicates) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

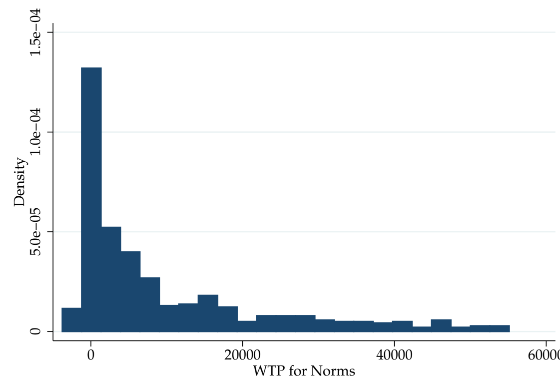
Figure 4: Distribution of WTP_i for six attributes

(a) Family



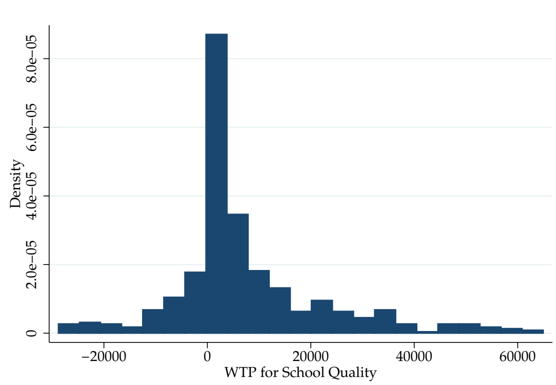
(μ = 27297; median = 20192; p10 = 1875; p90 = 65542; N = 971)

(b) Cultural Norms



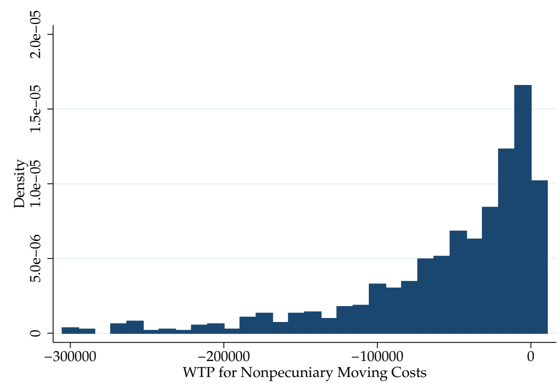
(μ = 9613; median = 3813; p10 = −8; p90 = 30375; N = 538)

(c) School Quality



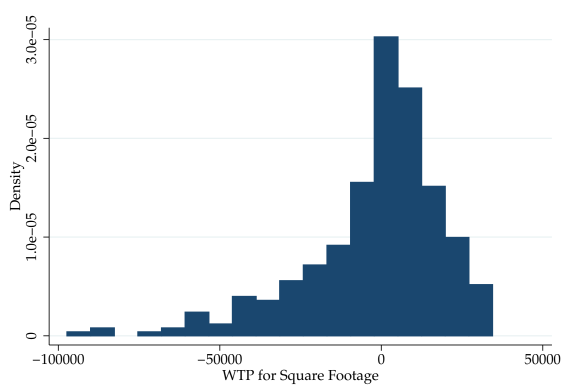
(μ = 7108; median = 2936; p10 = −5951; p90 = 27564; N = 538)

(d) non-pecuniary Moving Costs



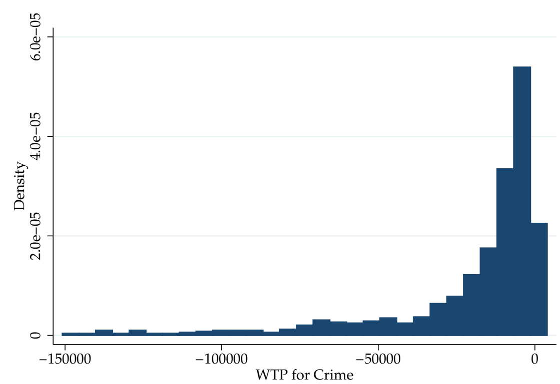
(μ = −52460; median = −31542; p10 = −140623; p90 = 527; N = 1072)

(e) Square Footage



(μ = −2067; median = 2335; p10 = −31080; p90 = 20896; N = 343)

(f) Crime



(μ = −20149; median = −9222; p10 = −59615; p90 = −1094; N = 907)

Notes: Plots show the distributions of individual-level WTP, after removing never-movers, those with very small or negative income elasticities (36% of the full $N = 2,110$ sample), and the top and bottom 5 percent of remaining observations (top and bottom 10 percent for non-pecuniary moving costs).

Table 8: Median Willingness to Pay by Attribute and Demographic Group

Attribute	Men	Women	White	Non-white	Renter	Owner	Non-college	College	Young	Old	Single	Married	No Kids	Kids
Housing Costs	-1,194	-1,476	-189	-1,441	-1,946	-1,198	-1,226	-1,216	-1,194	-1,357	-4,133	-827*	-1,441	-1,194
Crime	-9,310	-8,954	-9,964	-9,024	-7,822	-9,466	-9,529	-8,692	-7,408	-10,974*	-7,822	-9,466	-9,310	-8,516
Distance	-512	-688	-665	-624	-553	-661	-759	-480	-505	-721	-666	-599	-620	-645
Family Nearby	18,874	21,775	20,273	20,162	19,568	20,612	20,366	20,162	18,791	23,485*	20,352	20,162	20,775	17,777
Square footage	1,394	3,287	3,568	2,196	3,114	1,800	3,289	1,783	3,289	1,146	1,078	2,788	838	4,232
Financial moving costs	-695	-2,282*	-1,147	-1,565	-1,631	-1,360	-1,829	-1,087	-1,183	-1,927	-2,311	-1,043	-1,787	-813*
Taxes	-5,261	-4,271	-4,625	-4,966	-3,913	-4,988	-6,101	-3,913	-3,593	-6,708*	-3,913	-5,046	-4,988	-4,693
Norms	3,343	4,243	4,243	3,731	4,519	3,573	4,715	3,141	4,033	3,521	4,548	3,343	3,433	4,422
School quality	2,304	3,703	4,120	2,581	2,415	2,939	3,102	2,727	3,659	2,049	1,902	3,196	1,706	5,442*
Local move	12,164	8,895	10,204	10,741	8,541	11,143	8,398	13,088*	15,617	6,002*	8,541	12,384	8,541	16,222*
Same Residence	1,112	805	2,400	797	399	1,155	1,050	1,052	682	1,155	837	1,073	1,095	797
Psychic moving cost	-36,700	-27,940	-27,292	-33,417	-21,473	-36,239*	-27,808	-34,271	-28,425	-37,332*	-25,064	-36,478*	-30,047	-35,822

Note: Sample size differs across columns but removes never-movers and those with very small or negative income elasticities (36% of the full $N = 2,100$ sample). * indicates that the difference in the medians is significant at the 5 percent level. Significance is based on bootstrapped standard errors (1000 replications).

Table 9: Quantile regression estimates of moving costs

Characteristic	(1) Non-monetary moving cost	(2) Non-monetary moving cost	(3) Non-monetary moving cost
Homeowner	-14,831***	-11,591**	1,537
	(4,689)	(5,417)	(3,679)
Age		-348**	-326***
		(168)	(124)
Stuck			4,671
			(3,614)
Rooted			-47,449***
			(4,760)
College graduate	-6,338	-8,326**	-4,311
	(4,408)	(4,177)	(3,325)
Employed full-time	4,121	1,408	-457
	(4,309)	(4,631)	(3,689)
Lives with children	-2,227	-5,949	-5,601
	(4,907)	(4,882)	(3,849)
Constant	-19,256***	-1,190	2,821
	(4,296)	(8,599)	(7,327)
Observations	1,340	1,340	1,340

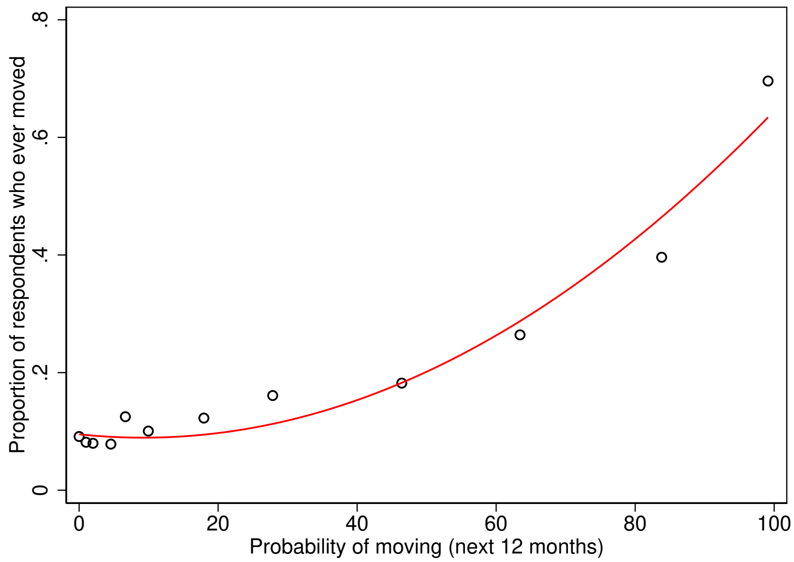
Notes: Samples removes never-movers and those with very small or negative income elasticities (36% of the full $N = 2,110$ sample). Clustered bootstrapped standard errors (1000 replicates) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 10: Median Willingness to Pay by Attribute and Chosen Level of Attribute

	Existing Amount of Attribute	
Attribute	Low	High
Housing costs	-1,490	-1,213
Crime	-9,298	-9,138
Family nearby	14,365	22,751*
Square footage	4,338	1,122
Financial moving costs (%)	-5.14	-1.72*
Taxes	-5,951	-3,922
Norms	4,987	3,160
School quality	1,706	5,442*
Same residence	399	1,155
Nonpecuniary moving cost	-55,281	-19,449*

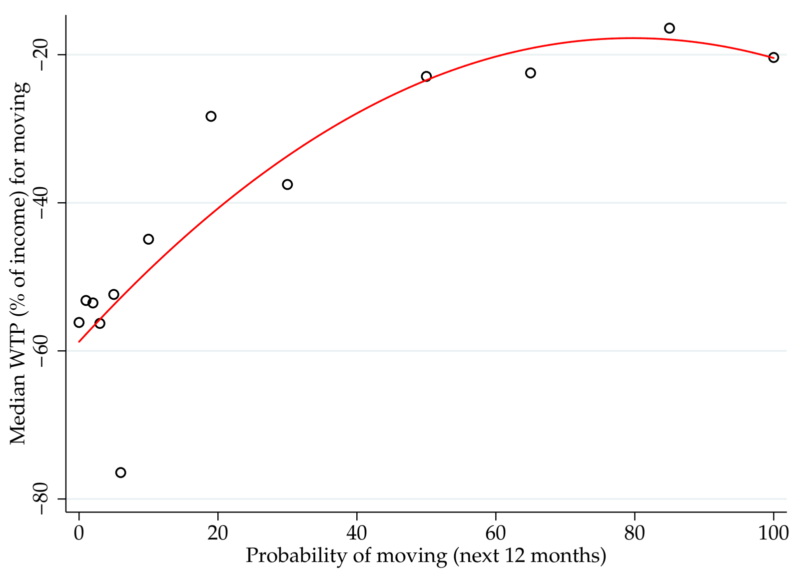
Note: Sample size differs across rows but removes never-movers and those with very small or negative income elasticities (36% of the full $N = 2,110$ sample). * indicates that the median difference is significant at the 5 percent level. Significance is based on bootstrapped standard errors.
A high amount of the existing attribute refers to having an amount above the median for the following attributes: housing costs, crime, square footage, and taxes. For family, it refers to living within 50 miles of a family member. For financial moving costs, it refers to being in the top half of the income distribution. For norms, it refers to reporting the current agreeableness of norms as very or extremely. For school quality, it refers to having a child in the home under the age of 18. For same residence, it refers to owning a home. For nonpecuniary moving costs, it refers to having an unconditional future move probability of 10% or higher.

Figure 5: Mobility Expectations and Realized Mobility Decisions



Notes: This plot shows the relation between actual mobility decisions (on the y-axis) and the year-ahead moving expectations of the respondents in the full SCE panel.

Figure 6: Mobility Expectations and Non-pecuniary Moving Costs



Notes: This plot shows the relation between non-pecuniary moving cost (WTP, as a percentage of income) on the y-axis and the year-ahead moving expectations of the respondents included in the September 2018 wave. Excludes never-movers and those with extremely small, negative, or undefined income elasticities (36% of the full $N = 2,110$ sample).