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Location Preferences and Slums Formation: Evidence from a Panel of Residence Histories[☆]

Pablo Celhay^a, Raimundo Undurraga^{b,*}

^a Escuela de Gobierno and Instituto de Economía, Pontificia Universidad Católica de Chile, Chile

^b Departamento de Ingeniería Industrial, Centro de Economía Aplicada, Universidad de Chile, Chile

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ABSTRACT

Slum dwellers may decide to live in slums due to location preferences, even though they have access to subsidized housing in the city outskirts. We examine this hypothesis by studying the evolution of location choices across slum and subsidized housing dwellers, for which we construct a panel of residential trajectories that spans between 1960 and 2008 in Santiago, Chile. While slum and subsidized housing dwellers are born in municipalities with statistically comparable levels of wealth, labor force participation, and share located in the inner urban zone, we find that slum dwellers are more likely to end up living in municipalities located in the inner city, with lower poverty levels, and higher levels of labor force participation. Consequently, employment rates among slum dwellers are significantly higher. Still, slum dwellers show inferior housing. From a revealed preferences approach, this result suggests that slum dwellers are willing to consume lower quality housing for geographical access to better labor opportunities. We further examine this hypothesis by using a trade-off game designed to elicit stated-preferences for location (relative to housing) and find that, consistent with their revealed preferences for location, slum dwellers are significantly more likely to prioritize location quality over housing quality than their subsidized housing counterparts. Overall, our results suggest that location preferences play a non-negligible role in slums formation.

1. Introduction

Slums are typically associated with chronic poverty. Some argue that poor housing quality and inadequate access to safe water and sanitation trap a majority of slum residents in poverty (UNHabitat, 2003a; UNHabitat, 2003b; Davis, 2006; Marx et al., 2013). Glaeser (2011) recognizes that slum dwellers often suffer from the consequences of housing deprivation and geographic isolation, but also states that living

in slums allows the poor to improve their labor productivity by taking advantage of the economies of scale and networks offered by inner zones of cities. Indeed, a large number of slums are located in highly prized lands near city centers, where there is better access to paid jobs (Bird et al., 2017; Galiani et al., 2017). A hypothesis is that slum dwellers are low income people with strong preferences for geographical access to better labor opportunities, i.e., they are willing to live close to the city center to the detriment of housing quality and access to basic services.

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^{*} Corresponding author.

E-mail address: raimundo.undurraga@dii.uchile.cl (R. Undurraga).

Consequently, some of them may not apply to subsidized housing if these are located in the outskirts of the city (Barnhardt et al., 2017).¹

In this paper, we empirically examine the extent to which slum dwellers prioritize location quality over housing quality. Our aim is understanding the role of location preferences on slum formation, especially in contexts where housing subsidies are widely available. To do so, we analyze data from a unique household survey implemented in 2008 in Santiago, Chile, where the provision of housing subsidies to slum and non-slum poor groups has a long tradition that dates back to the early twentieth century. The survey collects the residential trajectories experienced by a representative sample of slum dwellers across different periods of their life cycle, in particular the municipalities where they have settled on over time.² The same survey was also applied to a representative sample of households residing in subsidized housing projects, which serves as a (non-slum) comparison group.³ Our goal is not to estimate the causal effects of living in slums but rather to examine if the attributes associated to slum dwellers' location in the past (e.g., poverty, labor force participation, proximity to city center) explain preferences of poor households for locating in slums instead of formal housing, when the supply of subsidized housing is not constrained (as it is the case of Chilean context).

Our residential history data register information of the municipality of location of 2008 slum and subsidized housing dwellers in three residential periods of their life: birth residence, previous to current residence, and current residence. Hence, we build a panel-like data set that characterizes past movements of households over these three periods of their residential trajectories. We complement these data with Census data from 1960 to 2008, which allows us to characterize the municipality of residence at each period, including the levels of wealth (non-poverty) and labor force participation, as well as if the municipality is located within the inner urban zone of Santiago. We study whether the location characteristics of these three past periods differed across current slum and non-slum dwellers. The panel structure allows us to tease out unobserved individual fixed factors affecting location choice from birthplace to current residence, as well as to control for unobserved, across-location fixed factors at the time when the residential trajectories occurred.

Our results show that while both slum and subsidized housing dwellers are born in municipalities that are similar in terms of poverty, labor force participation, and location within the city, 2008 slum dwellers are more likely to have moved to relatively wealthier municipalities during their life. On average, these municipalities are more

likely to be located within the inner city limits, have lower levels of poverty, and have higher levels of labor force participation. Indeed, we find that while 2008 slum dwellers show extremely poor housing conditions, they are more likely to be employed than their subsidized housing counterparts.

Next, we test whether revealed preferences for location suggested by the previous results are consistent with subjective (stated) preferences for location. In particular, we analyze a hypothetical trade-off game (e.g., Robinson et al., 1975; Dowall and Juhasz, 1978; Smith and Joseph, 1982) where subjects choose one among multiple bundles of housing quality and location, with quality of the two dimensions per bundle varying inversely across bundles, i.e., as housing quality increases from one bundle to another, location quality decreases. The game was designed to elicit individuals' willingness to substitute housing quality for better location. Our results show that slum dwellers are more likely to choose bundles of better location and worse housing quality compared to the choices made by subsidized housing dwellers, which is consistent with the hypothesis that living in a slum is not only due to factors associated with poverty persistence, but also due to group-specific location preferences.⁴

Our paper contributes to a nascent body of empirical papers studying the determinants of slum formation and informal housing, all of which use cross-sectional data at either the individual, slum, or city levels, most notably Marx et al. (2013), Galiani et al. (2017), and Cavalcanti et al. (2018).⁵ Using data on slums in Sao Paulo, Brazil, Cavalcanti et al. (2018) show that individuals trade off housing quality and property taxes when choosing to live or not in informal dwellings. Our paper adds to this literature by exploring whether slum dwellers trade off housing quality and location quality, where location quality may or may not be correlated with the level of property taxes. Gechter and Tsivanidis (2020) examine spatial spillovers from urban renewal using a policy experiment in Mumbai that led 15% of central city land occupied by the city's defunct textile mills to be redeveloped during the 2000s, which allows them to estimate how slum cover changed in response to urban renewal. The authors find that urban renewal reduced slum cover over time, as well as informal employment. Relatedly, Henderson et al. (2017) use data on the evolution of land parcels on Nairobi's building industry to show that slum dwellers are willing to consume lower housing quality if that allows them to locate closer to the city center. Our paper differs from these works in that we use individual level data on residential trajectories (instead of slums or parcels), and our data from the trade-off game allows us to contrast objective (revealed) preferences for location with subjective (stated) location preferences. In addition, Franklin (2019) analyzes the effects of a program that randomly allocates slum dwellers into public housing through a lottery in Ethiopia, where housing subsidies for the poor are scarce, and find that a large part of lottery winners end up moving to better housing in the outskirts

¹ This would explain the decreasing popularity of the so-called "Sites-and-Services" policies which provide urbanized lots for slum dwellers to build their homes away from slum areas, thereby providing access to property rights and basic services like water and sanitation rather than housing units. These strategies have been widely criticized since offered plots are low price lands typically located in the outskirts of cities, breaking up the geographical opportunities that slum dwellers had built up around slum sites, perpetuating their poverty (Jaitman, 2015). Housing programs that provide formal housing units in the peripheries (instead of just "sites and services") are typically subject to the same critique since, even though beneficiaries now enjoy better housing conditions, those conditions are not sustainable without access to labor markets.

² Following UNHabitat (2003a), we define slums as informal settlements (i.e., poor neighborhoods) complying with one of the two following criteria: (i) at least 50% of the residents stay under illegal occupation, i.e., they either do not have land title or are (informally) renting to someone who does not possess land title, and/or (ii) at least 50% of the residents lack access to at least one of the following three basic services: electricity, drinkable water, and/or improved sanitation.

³ The data frame for subsidized housing dwellers comes from the list of DS49 housing projects kept by the MINVU (Ministry of Housing and Urbanicity). DS49 is the largest housing program in Chile, and it targets low income families, specifically the poorest 40% in the national income distribution.

⁴ The logic of our results follows Brueckner et al. (2019)'s model of location-backyarding trade-off. The authors show that having a better location (e.g., closer to jobs) increases rents, which disincentivize backyard (housing) consumption on the part of the owner.

⁵ The literature of slum formation was born under the aegis of the spatial mismatch hypothesis (Kain, 1968), which argues that slums are the product of a geographical poverty trap, i.e., slum dwellers are poor because they are spatially disconnected from job opportunities offered in the inner city. Note, however, that Kain (1968) referred to the case of United States, where jobs were moving from central cities to the suburbs, but black residents could not due to housing discrimination. In contrast, in our context most of the jobs, like the slums, are located in the inner city, suggesting that the mechanisms of slum formation are likely different to those hypothesized by Kain (1968). For a thorough review of the spatial mismatch theory, see the excellent work of Gobillon et al. (2007). For partial equilibrium models of slum formation, see Jimenez (1984, 1985), Friedman et al. (1988), Davis (2006), Kapoor and le Blanc (2008), Brueckner and Selod (2009), Brueckner (2013), and Cai et al. (2018).

of the city. Our study contributes by analyzing location-housing quality trade-offs in a context where slum dwellers have no constraints to accessing improved housing through subsidies; however, they are unwilling to trade location for it.

This is a simple and concise paper and is organized as follows. Section 2 describes the data. In Section 3 we present the empirical strategy and results. Finally, Section 4 concludes.

2. Data and measurement

We analyze data from a unique household survey that contains information for a representative sample of slum dwellers and subsidized housing dwellers residing in the Metropolitan Region (RM in Spanish) of Santiago, Chile, in 2008.⁶ By 2008, there were 122 slums in RM, for a total of 5,600 households and 22,240 individuals. By the same year, there were 350 housing projects in RM, for a total of 22,750 subsidized housing dwellers. Both groups together represent less than 1% of the population in RM. Our sample consists of 812 households in 69 slums and 776 households residing in 46 subsidized housing projects.⁷

2.1. Sampling procedure

2008 Slum Dwellers: each slum unit was selected from an official list of slums kept by TECHO, an NGO dedicated to providing informal settlers with better housing conditions and to assist them in the transition to formal housing. Following UNHabitat (2003a), slums were defined as poor neighborhoods complying with one of the two following criteria: (i) at least 50% of the residents stay under illegal occupation, i.e., they either do not have land title or are (informally) renting to someone who does not possess land title, and/or (ii) at least 50% of the residents lack access to at least one of the following three basic services: electricity, drinkable water, and/or improved sanitation. TECHO recognized 122 slums in the Metropolitan Region in year 2007 that comprised 5,599 households. The sampling frame was stratified according to land price and size of the slum, and 69 slums were randomly sampled for the survey. Note that in the sampling frame of TECHO, slums were not well-defined geographical units. To update the sample of 69 slums, interviewers in the field made a listing of households within each slum and draw a map of each slum to understand the geographical distribution and limits within each of them. An example of these maps is shown in Appendix Figure A1. Then, within each slum, a random sample of households was interviewed for a total of 812 households. Households within slums generally lack tenure on their property and as such are not legal owners of their house. However, within each slum, each housing unit has a recognized informal owner and their property is respected under informal arrangements.⁸

2008 Subsidized Housing Dwellers: the data frame for subsidized housing dwellers comes from the list of DS49 projects kept by the MINVU (Ministry of Housing and Urbanicity). In Chile, low income families, the poorest 40%, are eligible for housing subsidies under the DS49 program. Eligible families that do not own a house, opt to apply individually or collectively for subsidies to own a house. If they apply

individually, the house is built in a site that is previously owned by the individual. If they apply collectively, the group obtains a “housing project” between 10 and 160 housing units, all of which include, at the minimum (and from the beginning), basic services like electricity, water and sanitation. Some of them also include green areas. This is the most common application and all households in our sample of subsidized housing dwellers live in housing projects that resulted from the process of collective application. DS49 collective subsidies have an average value of USD \$15,000 per household (in dollars of 2008), and beneficiaries have to complement the subsidy with roughly USD \$800 per household in order to obtain it. New owners are not allowed to rent or either sell their property, but they can bequeath it to their children. We accessed a data frame that contained 350 housing projects corresponding to all housing projects that had been built in RM between 1990 and 2008 by MINVU. In the first stage, a random sample of 46 housing projects was selected from this list. Within each project, a random sample of subsidized dwellers was taken, for a total sample of 776 households. For household selection within housing projects, we follow the same criteria as in the slums case.

The DS49 program almost fully cover the supply of public housing in Chile. It was inaugurated in the early 2000s, yet it is not the first of its type. The Chilean government started implementing housing policies at least since 1906, with the promulgation of the Workers Housing Law (“Ley de Habitaciones Obreras”). However, it was not until 1953 with the creation of CORVI (National Housing Corporation) that the government started to provide housing subsidies to poor groups, although not in a massive way. Another important milestone was the creation of the Ministry of Housing and Urbanicity (MINVU) in 1965, which institutionalized the public housing policy and incorporated urban planning as a complementary policy objective in addition to housing. Then, during the Pinochet’s dictatorship, the market for public lands was liberalized and the private sector started to play a prominent role in the production of public housing for the poor. Democracy was reestablished in 1990, yet the role of real estate in the public housing market continued growing. Note, however, that it is just from the early 2000 onward that the offer of public housing to poor groups has massified (Rivera, 2012). Indeed, more than 70% of existing housing projects were built after 2000. Today, almost 100% of public housing being offered by private companies, and more than 90% of them financed through housing subsidies like the DS49.

2.2. Questionnaire and descriptive statistics

The questionnaire contains information about the residential history of each household, location preferences, housing quality, incomes and employment, perception of economic opportunities in the neighborhood, neighborhood security, expectations, and a full socio-demographic characterization of household members. Appendix Table A1 shows some descriptive statistics of 2008 slum and subsidized housing dwellers included in our analysis. The table shows the mean, standard deviations, and observations for each group, and p-values for the mean differences between them. On average, individuals that live in slums are younger compared to individuals that live in subsidized housing (25 years vs. 27 years), and have completed less years of schooling (6 vs. 7). While unemployment rates and wages are statistically similar across groups, slum dwellers are more likely to be employed (57% vs. 54%). The next panel shows variables computed at the household level. The percentage of households that live under the national poverty line in Chile are lower in slums (11% vs. 13%). Households in slums are slightly smaller in terms of household members (3.9 vs. 4.2), and household heads in slums are more likely to have been born in a slum (14% vs. 7%).

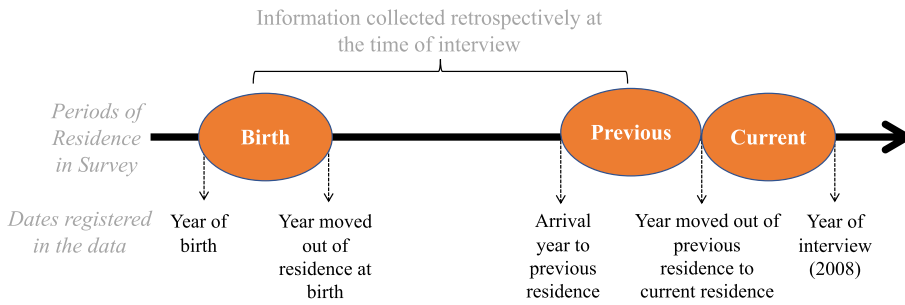
2.2.1. Timing of Residential History

The survey also asks household heads and spouses for how many times they have moved across different residences in her life. If they

⁶ The Metropolitan Region is a first order administrative division of Chile and contains the capital, Santiago. It has an area of roughly 6,000 square miles and a population of over 7 million, which represents 40% of the national population.

⁷ The survey was implemented by Observatorio Social at Universidad Alberto Hurtado (OSUAH) in 2008 where one of the authors worked at the time and led the survey design, fieldwork data collection, and analysis.

⁸ The number of targeted respondents per slum were defined based in the population size of the slum, with larger slums having a larger number of targeted respondents. When targeted respondents were absent, a random selection among non-sampled households within the same neighborhood was performed to replace the missing case.

**Fig. 1.** Timing of the Data

Note to Fig. 1: This figure shows timing of the residential history captured in the survey. Individuals are asked about how many times they have moved from residences over their life span. The survey collects data up to three periods of residence: birth, previous, and current, where each of these denotes residence at birth, previous residence, and current residence, respectively. “Birth” denotes the period from birth year to the year the individual left the place where she was born. “Previous” denotes the previous to current residence of the individual. Finally, “Current” denotes the place where the individual lives at the moment of the survey and comprises the time be-

tween year of arrival to that place and the year of the survey (2008).

Table 1

Differences in housing and location quality by dwelling type.

Panel A: Connection to basic housing utilities		External Tap Water		Internal Tap Water		Sewage		Electricity	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Slum = 1		-0.178*** (0.018) [0.044]	-0.176*** (0.018) [0.043]	-0.333*** (0.018) [0.041]	-0.322*** (0.018) [0.041]	-0.451*** (0.009) [0.032]	-0.445*** (0.009) [0.029]	-0.279*** (0.018) [0.049]	-0.273*** (0.018) [0.048]
Observations		1,589	1,589	1,589	1,589	1,589	1,589	1,589	1,589
Average for Subsidized Housing Controls		0.956	0.956	0.956	0.956	0.909	0.909	0.949	0.949
		No	Yes	No	Yes	No	Yes	No	Yes
Panel B: Housing materials		Walls Solid		Floor Solid		Roof Solid		If House is a Shelter Unit	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Slum = 1		-0.428*** (0.012) [0.035]	-0.430*** (0.012) [0.035]	-0.476*** (0.006) [0.010]	-0.472*** (0.006) [0.011]	-0.465*** (0.008) [0.019]	-0.454*** (0.009) [0.020]	0.356*** (0.017) [0.031]	0.342*** (0.017) [0.031]
Observations		1,589	1,589	1,589	1,589	1,589	1,589	1,589	1,589
Average for Subsidized Housing Controls		0.854	0.854	0.924	0.924	0.905	0.905	0.056	0.056
		No	Yes	No	Yes	No	Yes	No	Yes
Panel C: Location dimensions		Closeness to Jobs as 1st or 2nd Priority for Location Choice		Employment of Household Members		Choose same municipality within same city		Choose different municipality within same city	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Slum = 1		0.121*** (0.023) [0.034]	0.130*** (0.023) [0.035]	0.036** (0.015) [0.019]	0.032** (0.013) [0.017]	0.276*** (0.021) [0.036]	0.256*** (0.021) [0.036]	-0.133*** (0.018) [0.032]	-0.135*** (0.018) [0.031]
Observations		1,589	1,589	4,308	4,308	1,589	1,589	1,589	1,589
Average for Subsidized Housing Controls		0.262	0.262	0.537	0.537	0.288	0.288	0.213	0.213
		No	Yes	No	Yes	No	Yes	No	Yes

Note: This table shows the marginal effects of a Probit model for different dependent variables on an indicator variable that equals one if the household is currently living in a slum and zero if not (*Slum* = 1). In Panel A dependent variables are binary indicators, each of which is equal to one if the house is connected externally to tap water, connected internally to tap water, have access to sewage, and have access to electricity systems; and zero if not. In Panel B, we show dependent variables as binary indicators for whether wall, floor, or roof are solid and a dummy that equals one if the house is considered by interviewers as an emergency housing unit, and zero otherwise. In Panel C, first column, the dependent variable is a dummy that equals one if she chooses “to be located close to jobs” as either her first or second priority when asked about the attributes she consider when choosing a location to live in, and zero otherwise. The next dependent variable is equal to one if any member of the household is employed and equal to zero otherwise. The last two dependent variables are dummies for an hypothetical scenario where the individual had the chance to move from its actual location to a new location within the same municipality, to a different municipality within the same city, or to a different municipality in a different city (not included). Regression (1) corresponds to the bivariate regression and regression (2) controls for a quadratic polynomial of household head’s age and years of schooling, and sex. The unit of analysis is a household, except for Panel C: Employment of Household Members where the unit is household members above 15 years old. Robust standard errors are shown in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Also, standard errors clustered at the neighborhood level (the primary sampling unit from the 2008 survey design) are shown in brackets.

have moved at least once, the survey registers a residential history for that interviewee. Fig. 1 below details the timing of the residential history captured by our survey. Consider first an individual that has moved twice or more in her lifespan. The survey registers information on three sequential periods, which we call “birth”, “previous”, and “current” to denote, respectively, residence at birth, previous residence, and current residence. If an interviewee moved just once, then the module registers information on the periods “birth” and “current”. If an interviewee never moved, the module only registers information on the period “current”.

Each period (birth, previous, current) has a location, a starting date and an end date (i.e., a positive duration) as reported by individuals and noted in Fig. 1 at the bottom. A move is represented by a single date, but does not have a unique location, because by construction it involves going from one location to another. For the case of the period “birth”, we code the year of birth and the year she moved from birthplace. For the period “previous”, we code the year she arrived that location and the year she moved from the previous location to the current location. For the period “current”, we register the year she arrived the current location and the survey year (2008) as the end date. As such the end year

for the last period is right censored. Also, by construction the year she arrived the location at the period “current” is the same as the year she reports as ending year for the period “previous”.

We construct a panel-like data set with the periods for each individual. Some individuals will have one period, some individuals will have two periods, and some will have three periods, depending on how many times they moved. On average, individuals in the sample have moved 3.4 times in their life, and the most recent move was 10 years ago. 2.9% of individuals moved only once and 2.5% never moved, i.e., remain in the same residence of birth. Based on the years at the starting and ending point of each period we calculate the duration of that period. We also observe the municipality where the interviewee was located during each period,⁹ housing type, family members that lived with the interviewee in each period, and whether the place during the period was a slum.

Note that the survey does not collect data on any other movements between the periods “birth” and “previous”. As such, this is a censored panel where we do not have information of residential transitions between the first (“birth”) and second period (“previous”). This will have consequences for our empirical strategy. First, the external validity of our evidence is restricted to these three periods, and thus it might not be valid for the complete history of residential transitions experienced by individuals. Second, time differs across individuals for a similar period, i.e., the periods “Birth”, “Previous”, and/or “Current” may occur in different moments of time (e.g., calendar years) for each individual. Also, time difference between periods differs across individuals, i.e., the duration of each residence is not the same for all individuals. For instance, some could have resided more time in previous location than others. However, we will be able to include individual fixed effects that will control for unobserved individual characteristics that vary across individuals but are fixed over periods, as well as fixed effects for decade of arrival to the location in each period, which will help to control for unobserved fixed factors across-location at the time when each period occurred.

2.3. Characteristics of municipalities across periods of residence

In order to study how the characteristics of municipalities where slum and subsidized housing dwellers lived changed over these periods we characterize each municipality in three dimensions: wealth, labor force participation, and whether the municipality was within the inner urban zone of Santiago. We do this using data from IPUMS International (IPUMS-I) for Chile, which is available for the years 1960, 1970, 1982, 1992 and 2002¹⁰. The outcome variables are all at the municipality level and are constructed as follows:

- Within Inner City: We code each municipality in the data as one if they are part of the inner urban zone of Santiago, and as zero if not.
- Wealth (Non-Poverty): We use principal components analysis and compute a Wealth Index for each household in the Census data.¹¹ For the principal component analysis, we used education of household head, a dichotomous variable indicating if the person is a homeowner, number of rooms in the house, if the person is employed or not, if it has a manufacturing job or not, and an indicator variable that equals 1 if household owns at least one motorized vehicle,

television, radio refrigerator, and/or washing machine. For analytical purposes, those who are above the national median of the Wealth Index are considered as non-poor. We then compute the percentage of households in each municipality that are above the national median of the Wealth Index to proxy for the level of non-poverty in the municipality. As such, the larger is that percentage of residents above the national median, the less poor is the municipality.

- Labor Force Participation: Each census asks whether the household head is active or inactive in the labor force. For each municipality, we compute the percentage of household heads between 14 and 65 years old that are participating in the labor force regardless of whether it is self-employment or employment.

With these measures at each Census we are able to characterize municipalities at the beginning of each period: year of birth, year of arrival to previous residence, and year of arrival to current residence. In case the starting time of a period corresponds to a non-Census year we do the following imputation. If the individual reports that her year of arrival is, say, before 1965, then for that period we impute the variables from the 1960 Census. In contrast, if the reported year of arrival is, say, after 1965 and before 1970, then we impute the 1970 values, and so on for each decade.

3. Empirical analysis

3.1. Location and housing in santiago slums at the time of the Survey (2008)

In this section we describe the trade-off between location-quality and housing-quality. We characterize differences between 2008 slum dwellers and 2008 subsidized housing dwellers in terms of housing conditions and questions related to individuals' willingness to move from their current residence. Table 1, Panel A, shows average marginal effects from a probit regression of binary indicators for whether the household has access to external and internal tap water, a sewage connection, and electricity, against a binary indicator for whether the house is located in a slum. Model (1) presents coefficients from the bivariate model while model (2) presents the estimated coefficients after controlling for a quadratic polynomial of household head's age, years of schooling, and sex. Robust standard errors are presented. Following Abadie et al. (2017), we additionally report standard errors clustered at the neighborhood level, which was the primary sampling unit from the 2008 survey design.¹²

The results show that, by 2008, individuals living in formal housing have almost full access to all basic services. The coefficients are large, suggesting that slum dwellers have very poor access to basic services. For instance, the percentage of slum dwellers with a sewage connection is 44 percentage points lower than that of those living in subsidized housing. This is also reflected in Panel B of Table 1 where we examine differences in housing materials. Less than half of slum dwellers live in housing units with walls, floors, or roofs made out of solid materials such as concrete, zinc, or wood. Moreover, slum dwellers are 34 percentage points more likely to live in a house that is considered by interviewers as

⁹ That is, municipality of birth place, municipality of the residence previous to current residence, and municipality of current residence.

¹⁰ The data corresponds to 10% sample of each Censo General de Población y Vivienda Chile, except for 1962, which corresponds to a 1.2% sample of the Census. Data extracted from Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.1 [dataset]. Minneapolis, MN: IPUMS, 2018. <https://doi.org/10.18128/D020.V7.1>.

¹¹ See Filmer and Scott (2008) for a discussion of Wealth Index as a proxy for socioeconomic status in the absence of income data.

¹² Abadie et al. (2017) suggest that what matters for clustering is how the sample was selected and whether there are clusters in the population of interest that are not represented in the sample. In our case, the 2008 survey to slum and subsidized housing dwellers followed a two-stage sampling procedure that first randomly selected a sample of neighborhoods (slums and housing projects) and then, within each neighborhood, a random sample of households was interviewed (see Section 2.1 for details). Our goal is to say something about the overall population living in either slums or housing projects, yet there are neighborhoods in the population that are not represented in our sample. Hence, following the sampling perspective of Abadie et al. (2017), we cluster the standard errors at the neighborhood level.

an emergency housing unit.¹³

In Panel C of Table 1 we look at different variables in the survey related to the trade-off between location-quality and housing-quality. When interviewees are asked about the most important attributes they consider when choosing a location to live in, the share of slum dwellers reporting “to be located close to jobs” as either their first or second priority is 13 percentage points higher compared to their subsidized housing counterparts. In fact, when we look at actual labor outcomes (next column), we find that slum dwellers are 3.2 percentage points more likely to be employed, on average.

Finally, the survey asked where respondents would move if they had the possibility. There were three options given: moving to another place within the same municipality, moving to another place in a different municipality but within the same city, and moving to another city. The objective was to explore differences between slums and subsidized housing dwellers in preferences for their current location. We find that slum dwellers are 25 percentage points more likely to choose to remain within the municipality where they are located at the moment of the survey. Likewise, slum dwellers are 13 percentage points less likely to want to move to another municipality within the same city. Lastly, when slum dwellers are asked about whether they are willing to apply for the DS49 housing subsidy, 88% report affirmatively. However, 50% of them would not use the subsidy if that implies moving to a housing project located far from their actual location.¹⁴

In summary, slum dwellers live under poorer housing conditions than subsidized housing dwellers. However, they are less willing to move from their actual locations, presumably due to their better access to labor markets. The latter is consistent with the hypothesis that location preferences do affect the decision of whether to live in a slum or not. We explore this hypothesis in two ways. First, we characterize and compare past residential trajectories of slum dwellers and their counterparts. The goal of this analysis is to examine whether characteristics of the locations that these two groups have lived in the past differ and whether these differences show that, over time, slums dwellers have searched for places that are relatively better in terms of location-quality. Second, we implement a trade-off game to study whether the two groups differ in terms of subjective (stated) preferences of location.

3.2. Changes in location characteristics across periods and revealed preferences for location

In this section we examine if the attributes associated to municipalities in each period differ between slum dwellers and subsidized housing dwellers. Our residential history data register information of the municipalities where slum and subsidized housing dwellers are located in three periods: birth, previous, and current residence; as well as the dates of arrival and moving for each period (see section 2.2.1). We thus compare the characteristics of the municipality where 2008 slum dwellers and 2008 subsidized housing dwellers resided at each period. We use the year of arrival and municipality reported in each period instead of exact dates and locations. We do this since exact locations (e.g., addresses) are missing for a large share of the sample, and we only

have access to Census data at the municipality level. Also, we believe that municipality of location is less subject to recall error.

Graphical Analysis. Fig. 2 illustrates mean differences in location characteristics between slum and subsidized housing dwellers. Panel (a) shows the percentage of households in each group living in municipalities located in the inner urban zone of Santiago. At “birth”, the percentage of households that lived in municipalities located within the inner city is similar across groups, roughly 17%. This tendency remains intact in the subsequent periods. However, in the period “current”, both slum and subsidized housing dwellers live in municipalities located in less central areas relative to the location in the previous period. Yet, approximately 10% of 2008 slum dwellers reside, during the “current” period, in municipalities located within the urban limits of the city of Santiago compared to less than 2% of subsidized housing dwellers. The differences in the residential transitions across groups may reflect that slum dwellers strategically avoided worse locations by resisting social housing policies that resolve housing needs for the poor in the city outskirts.

Panel (b) shows the percentage of households in the municipality of residence that are above the national median of poverty, while Panel (c) shows the percentage of households in the municipality of residence that are economically active (participate in labor force). Since central areas of the city are wealthier, slum dwellers tend to locate in municipalities with a lower share of poverty and higher levels of labor force participation. For instance, Panel (b) shows that the share of non-poor in the municipality of residence at birth is very similar for both groups. On average, slum and subsidized housing dwellers were born in municipalities where 50% of households were above the national median of wealth (measured by the Wealth Index), i.e., where half of the municipality population are non-poor. This is similar for “previous” period. However, in the “current” period, slum dwellers reside in municipalities with higher levels of non-poor people. Likewise, while both groups were born in places with similar levels of labor force participation (Panel (c)), slum dwellers in the “previous” period were more likely to live in municipalities with relatively higher levels of labor force participation, difference that persists over time. Note that the latter does not mean that slum dwellers have always moved to municipalities with higher levels of labor force participation (in absolute value), but to municipalities where labor markets are relatively more active compared to those to which subsidized housing dwellers have moved to.

Regression Analysis. We turn now into a linear regression framework. This analysis adjusts the differences in Fig. 2 for individual and time fixed effects, as well as for demographic characteristics of individuals. Our goal is to compare the characteristics of locations across periods of individuals who are living in slums in 2008 (year of the survey), with the characteristics of locations across periods of 2008 subsidized housing dwellers.¹⁵ We first define a dummy variable ($Slum_i$) for whether the individual i is living in a slum or not in 2008, i.e., at the current period. Then we define period indicators, denoted by t . We also know the municipality of residence at each period, noted by m , and so we can construct for each individual i , a particular characteristic of that municipality m , at each period t .

Thus, we estimate differences in the characteristics of the municipality of residence at each period between 2008 slum dwellers and 2008 subsidized housing dwellers. In particular, we test for whether relative to subsidized housing dwellers, 2008 slum dwellers are more likely to have moved towards municipalities that are located within the inner zone (Within Inner City), that perform better in terms of wealth (Non-

¹³ This is similar to temporary shelter units constructed from discarded materials such as cardboard, tin and plastic; have dirt floors and lack connections to basic utilities such as water supply and sewerage systems.

¹⁴ Response to this question is conditional on that they get the housing subsidy. Note that there is some uncertainty regarding the location of housing projects financed through collective housing subsidies. First, subsidized households have to agree with the co-beneficiaries of the housing committee about the location of the new housing project, and location preferences may be heterogenous. Second, location of the new housing project is subject to the availability of lots, meaning that even though everyone agree in that the preferred location is “J”, there may not be available lots in “J” (e.g., due to price restrictions).

¹⁵ We study whether the group of 2008 slum and subsidized housing dwellers have had different residential histories in the past. As such, our goal is not estimating the causal effects of living in slums, but rather to estimate what causes people to move to slums versus subsidized housing, and we are doing so in an observational dataset with no exogenous variation to exploit, meaning the usual caveats about how establishing causality apply here.

Poverty), and that have higher levels of Labor Force Participation. The panel regression model (equation (1)) is the following:

where y_{imt} is the characteristic of the municipality m (Within Inner City, Non-Poverty, Labor Force Participation) where individual i resides at

$$y_{imt} = \beta_0 + \beta_1 Slum_i^c + \beta_2 Slum_i^c \times 1[t = previous] + \beta_3 Slum_i^c \times 1[t = current] + \beta_4 1[t = previous] + \beta_5 1[t = current] + X'_{imt}\gamma + \varphi_i + \eta_t + \varepsilon_{imt} \quad (1)$$

period $t = \{\text{Birth, Previous, Current}\}$. Birth refers to the location where the individual was born, Previous refers to the location where the individual resided immediately before arriving to the Current, and Current is the location at the moment of the survey (see Fig. 1).¹⁶ $Slum_i^c$ equals one if individual i is a slum dweller at the moment of the survey (year 2008) and zero if it is a subsidized housing dweller (non-slum) in that same moment. X'_{imt} includes age (and age squared) of arrival to the location in period t , as well as duration of residence (and duration squared) at location in period t (measured in number of years), both of which vary across individuals over periods. φ_i are unobserved individual characteristics that vary across individuals but are fixed over periods within individuals. η_t are fixed effects (binary indicators) for decade of arrival to the location in period t , with decades including 50's or before (base category), 60's (1960–1969), 70's (1970–1979), 80's (1980–1989), 90's (1990–1999), and 2000's (2000–2008), and ε_{imt} is a random shock correlated across periods for the same individual. The inclusion of decade fixed effects helps to sweep out some time variation, and thus address concerns related to the fact that neighborhoods may be changing over decades. Note, however, that the latter strategy does not fully address the concern of differential neighborhood change (for instance, within-decade changes that vary across neighborhoods are not controlled for).¹⁷

We interact $Slum_i^c$ with periods t to test whether the characteristic of the municipality of residence y_{imt} significantly changes between groups over periods t after we control for potential confounders. The differences between 2008 slums and non-slums dwellers at $t = \text{Birth}$ are represented by β_1 , after we adjust for X'_{imt} , φ_i , and η_t . In particular, if $\beta_1 = 0$, we claim that, relative to 2008 subsidized housing dwellers, 2008 slum dwellers were born in municipalities with similar characteristics in terms of closeness to the inner city, non-poverty, and/or labor force participation. The rest of the coefficients are interpreted as follows:

- β_2 : mean difference between the characteristics of the municipality where 2008 slum dwellers resided in the period Previous and the municipality where 2008 subsidized housing dwellers resided in the same period, with respect to the mean difference across groups at birth location (similar to a differences in differences estimator).
- β_3 : mean difference between the characteristics of the municipality where 2008 slum dwellers reside in the period Current and the municipality where 2008 subsidized housing dwellers reside in the same period, with respect to the mean difference across groups at birth location (similar to a differences in differences estimator).
- β_4 : mean difference between the characteristics of the municipality where 2008 subsidized housing dwellers resided in the period

Previous and the characteristics of the municipality where 2008 subsidized housing dwellers resided in the period Birth.

- β_5 : mean difference between the characteristics of the municipality where 2008 subsidized housing dwellers reside in the period Current and the characteristics of the municipality where 2008 subsidized

housing dwellers resided in the period Birth.

We are also interested in examining whether potential differences in the characteristics of the municipalities of residence across groups show any persistence over time. In particular, we test two null hypotheses:

- $H_0 : \beta_2 \geq \beta_3$: if there are no differences at municipality of birth across groups ($\beta_1 = 0$) and β_2 is non-negative, then rejecting the null hypothesis that $\beta_2 \geq \beta_3$ would imply that, relative to 2008 subsidized housing dwellers, 2008 slum dwellers persistently moved towards municipalities that are relatively richer over periods (i.e., better in terms of closeness to the inner city, non-poverty, and/or labor force participation).¹⁸
- $H_0 : \beta_4 \leq \beta_5$: if β_4 is non-positive, then rejecting the null hypothesis that $\beta_4 \leq \beta_5$ would imply that, over time, 2008 subsidized housing dwellers persistently moved over periods towards municipalities that are relatively farther from the inner city, poorer, and/or have lower levels of labor force participation.¹⁹

The persistence tests are important for the interpretation of the results. For instance, if we reject $H_0 : \beta_2 \geq \beta_3$ but not $H_0 : \beta_4 \leq \beta_5$, then the differences in the period trajectories across groups can be explained by the fact that 2008 slum dwellers persistently look for relatively better locations across periods, while 2008 subsidized housing dwellers tend to locate in similar municipalities across periods. Alternatively, if we do not reject $H_0 : \beta_2 \geq \beta_3$ but do reject $H_0 : \beta_4 \leq \beta_5$, then the difference in the quality of locations across groups is more likely to be due to that 2008 subsidized housing dwellers persistently moved to municipalities that are relatively poorer.

Results from estimating equation (1) are shown in Table 2. Model (1) is the uncontrolled version of equation (1), i.e., similar to what we observe in the graphical analysis. Model (2) adds age (and age squared) of arrival to the location in period t , duration (and duration squared) of residence at location in period t , individual fixed effects, and calendar time fixed effects for decade of arrival to the location in period t . The p-values for each test of persistence are shown at the bottom rows of the table. Standard errors are clustered at the individual level. Following Abadie et al. (2017), we additionally report standard errors clustered at the neighborhood level, which was the primary sampling unit from the 2008 survey design.

Within Inner City. First, as is shown in Table 2, column (1), there are no differences between slum and subsidized housing dwellers in terms of

¹⁶ Note that, when possible, the survey collects information about the residential trajectories separately for both household heads and spouses within a household. Since we are looking at three periods per individual, then the number of observations in the panel more than triplicates the number of households surveyed.

¹⁷ For robustness, we further test whether the results vary with the inclusion of decade fixed effects interacted with the different periods, and the results remain unchanged. These results are available upon request.

¹⁸ Note that the latter does not mean that slum dwellers have always moved to richer municipalities (in absolute value), but to municipalities that are richer compared to those to which subsidized housing dwellers have moved to.

¹⁹ Note that our panel is censored by three periods (Birth, Previous, Current), meaning that we do not observe intermediate residential trajectories that occurred between Birth and Previous periods. Thus, the potential differences in the characteristics of the municipalities of residence across groups will be considered as “persistent over time” only under the assumption that the characteristics of the municipalities of residence of those (unobserved) intermediate transitions follow a trend that is consistent with the trend of characteristics for municipalities in periods we do observe in our (censored) panel.

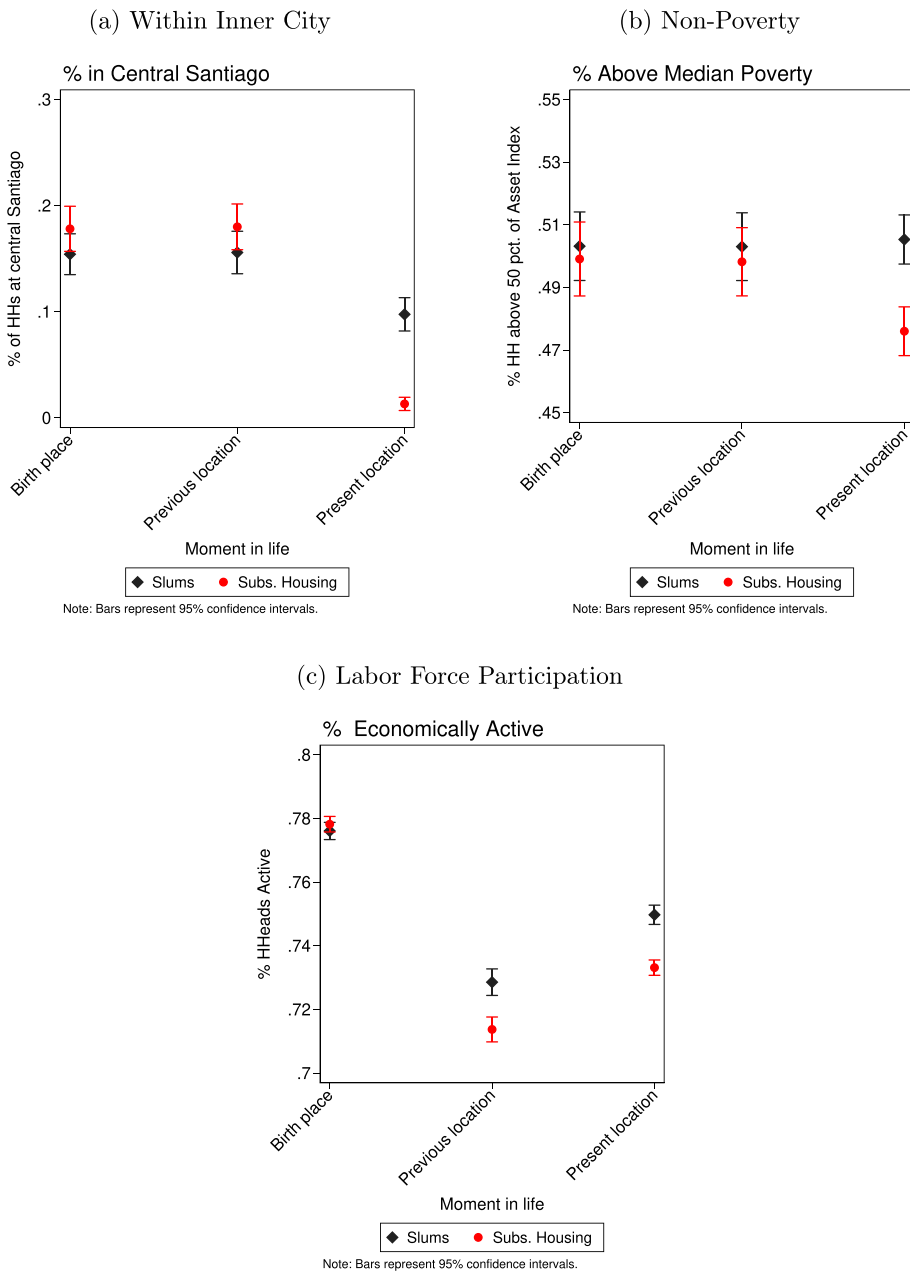


Fig. 2. Characteristics of the Municipality of Residence across Periods: Slum Dwellers versus Subsidized Housing Dwellers

Note: This figure illustrates means of variables related to the municipality of residence for 2008 slum dwellers and 2008 subsidized housing dwellers in different periods (moments) of their residential history: Birth, Previous to Present Location, and Present Location. Panel (a) shows the percentage of households in each group living in municipalities located in the inner urban zone of Santiago. Panel (b) shows the percentage of households in the municipality of residence that are above the national median of poverty. Panel (c) shows the percentage of households in the municipality of residence that are economically active (participate in the labor force).

the proportion of households living in municipalities located within the inner city at birth (β_1 is small and not statistically significant). Second, for the case of 2008 subsidized housing dwellers, we find that from birth to previous location they did not move to more central locations (β_4 is close to zero and non-significant). However, between previous and current location, the share of subsidized housing dwellers living in centrally located municipalities decreased substantially (negative and significant β_5), and this is reflected in the rejection of the null hypothesis that $\beta_4 \leq \beta_5$. We hypothesize that this is in part due to the fact that housing subsidies provided by the Chilean government follow a segregationist model where formal housing solutions are offered only on cheap land from municipalities located on the outskirts of cities.

In the case of 2008 slum dwellers, they also follow a similar tendency than their non-slum counterparts. However, compared to subsidized

housing dwellers, the results show that from birth to present location, slum dwellers are more likely to move to municipalities that are centrally located (positive and significant β_3). On average, column (2) shows that, from birth to current location, slum dwellers are 9.6 percentage points more likely than subsidized housing dwellers to have moved to municipalities located in the inner urban zone of Santiago, and this is reflected in the rejection of the null hypothesis that $\beta_2 \geq \beta_3$. This represents a 12% difference with respect to the share of surveyed people that lived in municipalities located within the inner city limits at birth (78%). These differences are statistically significant at conventional levels, and are also robust to clustering the standard errors at the neighborhood level.

Non-Poverty. As is shown in Table 2, column (3), there are no differences between slum and subsidized housing dwellers in terms of the

Table 2

Differences in the levels of Urbanization, Non-Poverty, and Labor Force Participation at the Municipality of Residence across Periods of Residence, by Dwelling Type.

	Within Inner City		Non - Poverty		Labor Force Part.	
	(1)	(2)	(3)	(4)	(5)	(6)
Slum = 1 (β_1)	-0.023 (0.016) [0.143] {0.400}		0.007 (0.008) [0.366] {0.614}		-0.005** (0.002) [0.017] {0.198}	
Slum x $t = \text{Previous}$ (β_2)	-0.014 (0.015) [0.357] {0.384}	-0.010 (0.016) [0.504] {0.507}	-0.004 (0.009) [0.642] {0.783}	-0.006 (0.009) [0.518] {0.686}	0.017*** (0.003) [0.000] {0.000}	0.006* (0.003) [0.050] {0.252}
Slum x $t = \text{Current}$ (β_3)	0.102*** (0.016) [0.000] {0.004}	0.096*** (0.017) [0.000] {0.006}	0.019** (0.009) [0.039] {0.463}	0.017* (0.010) [0.080] {0.519}	0.021*** (0.003) [0.000] {0.031}	0.006** (0.003) [0.039] {0.533}
$t = \text{Previous}$ (β_4)	0.002 (0.012) [0.871] {0.879}	-0.025 (0.025) [0.315] {0.412}	0.009 (0.007) [0.176] {0.478}	0.009 (0.015) [0.543] {0.630}	-0.079*** (0.002) [0.000] {0.000}	-0.007 (0.005) [0.141] {0.308}
$t = \text{Current}$ (β_5)	-0.166*** (0.012) [0.000] {0.000}	-0.181*** (0.028) [0.000] {0.000}	-0.016** (0.007) [0.020] {0.429}	-0.009 (0.016) [0.570] {0.704}	-0.062*** (0.002) [0.000] {0.000}	0.025*** (0.006) [0.000] {0.012}
Constant	0.181*** (0.012) [0.000] {0.000}	0.141*** (0.020) [0.000] {0.000}	0.492*** (0.006) [0.000] {0.000}	0.494*** (0.012) [0.000] {0.000}	0.796*** (0.001) [0.000] {0.000}	0.759*** (0.004) [0.000] {0.000}
Observations	7,196	7,196	7,196	7,196	7,196	7,196
Adjusted (R^2)	0.029	0.349	0.002	0.268	0.216	0.445
Controls	N	Y	N	Y	N	Y
Persistence F-tests						
p -value $H_0: \beta_2 \geq \beta_3$	[0.000] {0.001}	[0.000] {0.001}	[0.001] {0.088}	[0.001] {0.091}	[0.116] {0.330}	[0.516] {0.506}
p -values $H_0: \beta_4 \leq \beta_5$	[0.000] {0.000}	[0.000] {0.000}	[0.000] {0.021}	[0.002] {0.073}	[1.000] {1.000}	[1.000] {1.000}

Note: This table shows results from OLS regressions of equation (1) on three different dependent variables measured for the different periods of the residential history module of the survey: $t = \text{Birth, Previous, Current}$, (see Fig. 1). Dependent variables correspond to a binary indicator for whether the municipality is located within the urban belt of the city of Santiago (Within Inner City) in each period, the proportion of non-poor households (Non - Poverty) in the municipality of residence in each period, and the proportion of economically active households (Labor Force Participation) in the municipality of residence in each period. Model (1) is the uncontrolled version of equation (1). Model (2) adds age (and age squared) of arrival to the location in period t , duration (and duration squared) of residence at location in period t (measured in number of years), individual fixed effects, and calendar time fixed effects (binary indicators) for decade of arrival to the location in period t , with decades including 50's or before (base category), 60's, 70's, 80's, 90's, and 2000's. Observations with missing values in the control variables are dropped from the analysis (790 observations in total). Standard errors in parenthesis are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. In brackets we show the p -values after clustering at the individual level and in braces we show the p -values after clustering at the neighborhood level, which was the primary sampling unit from the 2008 survey design.

proportion of households above the national median of wealth in the municipality of birth (β_1 is close to zero). In the next period (previous location), β_2 indicates that there is no differential change at this period with respect to differences in non-poverty at birth between groups. However, if we compare differences between groups at birth location with differences between groups at their actual location, we find that slum dwellers have moved to municipalities with a higher share of non-poor residents compared to the case of subsidized housing dwellers (β_3). Our preferred specification (model (2)) indicates that, from birth to present, slum dwellers have moved to municipalities where the share of non-poor is 1.7 percentage points higher relative to the share of non-poor in the municipalities where subsidized housing dwellers have moved to. This represents a 3.4% difference with respect to the average share of non-poor in the municipality of birth (50%). The difference is statistically significant at the 10% level when clustering the standard errors at the individual level, but this result is not robust to clustering the standard errors at the neighborhood level. However, as is shown in the Persistence F-tests at the bottom of the table, we reject the null hypothesis that $\beta_2 \geq \beta_3$ (at 1% level when clustering at the individual level

and at 10% level when clustering at the neighborhood level), suggesting that, relative to subsidized housing dwellers, 2008 slum dwellers persistently located in municipalities with a relatively higher share of non-poor residents.

On the other hand, 2008 subsidized housing dwellers do not show a clear pattern in their movements. Looking at model (2) estimates, β_4 is positive (richer location relative to birth one), while β_5 is negative (poorer location relative to birth one), yet none of them are statistically significant at conventional levels, implying that the municipality characteristics throughout residential trajectories have not changed that much. As such, in terms of wealth (non-poverty), the observed differences between location characteristics of 2008 slum dwellers and 2008 subsidized housing dwellers across periods are mostly due to slums dwellers moving to relatively richer municipalities than due to subsidized housing dwellers moving to poorer ones.

Labor Force Participation. First, both groups were born in municipalities with somewhat similar levels of labor force participation, with a modest advantage for the case of housing subsidized dwellers (β_1 negative but small in magnitude). Taking our preferred model (model

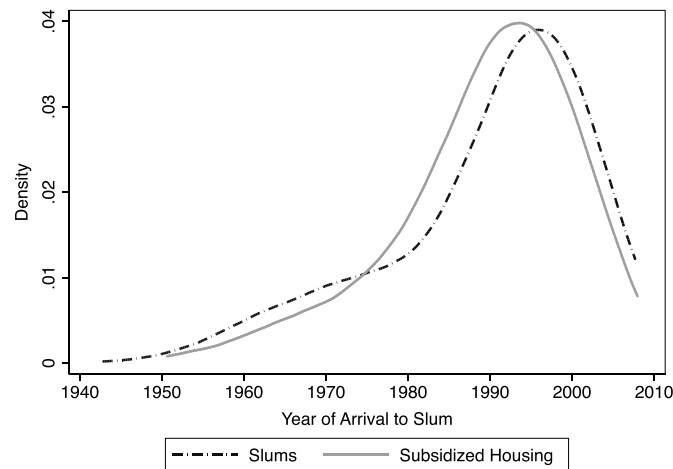


Fig. 3. Distribution of the Year of Arrival to Slum by type of Dweller

Note: This figure shows the distribution of the residualized year of arrival to the slum for two groups: 2008 slum dwellers and 2008 subsidized housing dwellers that lived in a slum in their previous location. In particular, we plot the predicted residuals from a regression of the year of arrival to the slum on the decade of birth, so that we indirectly control for differences in the intensity of the housing policy to which individuals of different generations have been exposed to in their life.

(2)), for the case of 2008 subsidized housing dwellers we find that from birth to previous location they seem to have moved to municipalities with lower levels of labor force participation (negative β_4). In contrast, their present locations show a labor force participation that is 2.5 percentage points larger relative to birth location (β_5), meaning they reverted the tendency in the last period, and that explains why we do not reject the null hypothesis that $\beta_4 \leq \beta_5$. Note that 2008 slum dwellers have moved towards municipalities with higher levels of labor force participation relative to their subsidized housing counterparts, and this has been the case across all periods (positive β_2 and positive β_3). In particular, column (6) shows that, from birth to 2008, slum dwellers have moved to municipalities where the labor force participation is 0.6 percentage points larger compared to the labor force participation in the municipalities where subsidized housing dwellers have moved to, on average. These differences are statistically significant at conventional levels, yet the results are not robust to clustering the standard errors at the neighborhood level. Finally, we fail to reject the null hypothesis that $\beta_2 \geq \beta_3$. This is congruent with Fig. 2, Panel (b), where we observe that the differences across slum and subsidized housing groups in terms of the labor force participation in their municipalities of residence start to show in the previous to present location and remain favorable to slum dwellers in the present location, yet the magnitude of those differences do not grow but stay constant across periods.

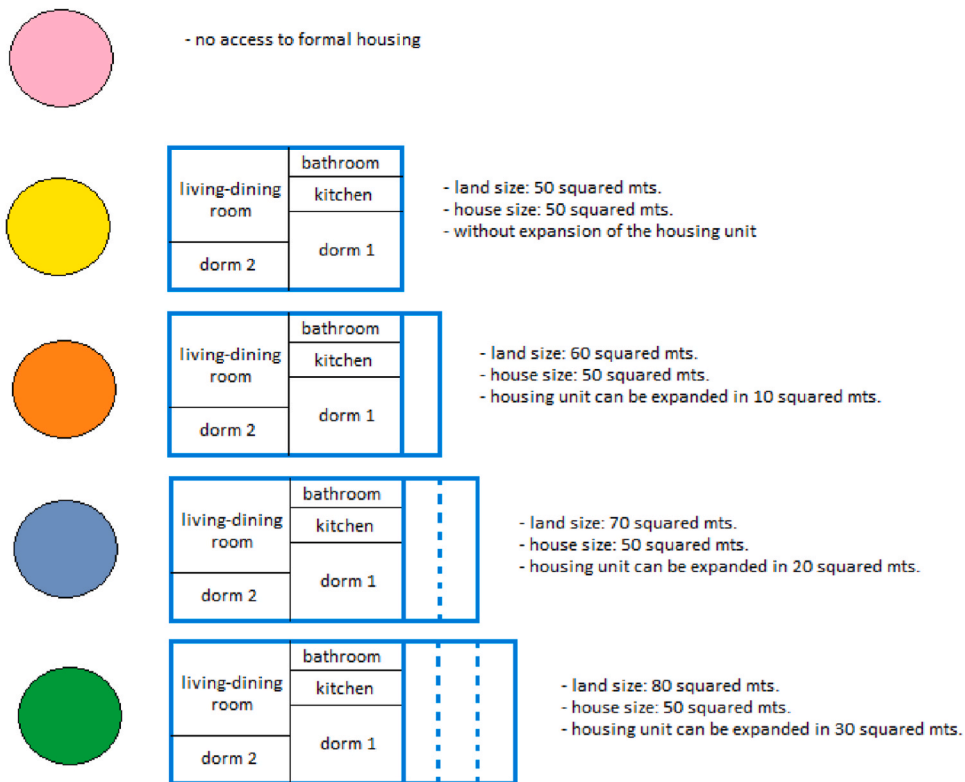
Overall, these results suggest that, relative to 2008 subsidized housing dwellers, 2008 slum dwellers live in municipalities that are located closer to the inner city, with a higher share of non-poor residents and higher levels of labor force participation, and this is even though both groups were born in municipalities with similar characteristics in these dimensions. Glaeser (2011) argues that the decision to live in a slum can be influenced by a location choice that maximizes the access to economic opportunities. Our results reinforce the hypothesis that location does matter for slum dwellers in the sense that they are willing to live in slums (with all the consequences that it implies, including low housing quality and limited basic services) if that allows them to optimize the geography of opportunities offered by cities.

3.2.1. Alternative explanations

Differential Access to Subsidized Housing. An alternative hypothesis is that there is rationing in the supply of housing subsidies, implying that preferences for location do not differ between slum dwellers and subsidized housing dwellers but that the latter group just got the subsidies earlier. In other words, both groups have the same preferences for location and housing quality but subsidized housing dwellers were able to satisfy them before than slum dwellers, i.e., slum dwellers are just in a transition phase, waiting for getting their housing subsidies. In order for this hypothesis to be valid one would expect that, within birth cohorts, current slum dwellers arrived to slums later than previous slum dwellers that already obtained the subsidies and are actually located in subsidized housing. However, this hypothesis is unlikely to be met since, historically, the assignment rule of housing subsidies does not discriminate on the residential status of the applicants; these are assigned through a means-tested program giving priority to those who lived under poverty for a longer time, regardless of whether they come from slums or not (Rivera, 2012).

Indeed, we test for the validity of this claim by using a subsample of 2008 subsidized housing dwellers that lived in a slum in their previous location. In particular, we compute their year of arrival to the previous location (by definition they were located in a slum at their previous location) and compare it to the year of arrival to the current location for the sample of 2008 slum dwellers (by definition they are actually located in a slum). Fig. 3 shows the distribution of the year of arrival for each group adjusted by birth cohorts. In particular, we plot the predicted residuals from a regression of the year of arrival to the slum on the decade of birth, so that we indirectly control for differences in the intensity of the housing policy to which individuals of different generations have been exposed to in their life. The distribution of the year of arrival to the slum is similar across groups. If anything, relative to 2008 slum dwellers (i.e., those who currently live in slums), 2008 subsidized housing dwellers that lived in a slum in their previous location is shifted slightly to the left. Yet, on average, the difference is small – 2.1 years – and not statistically significant. Indeed, we do not reject the Kolmogorov-Smirnov equality-of-distributions test. The latter suggests that housing rationing effects are unlikely to explain the location

(a) Housing Quality Card



(b) Location Quality Card

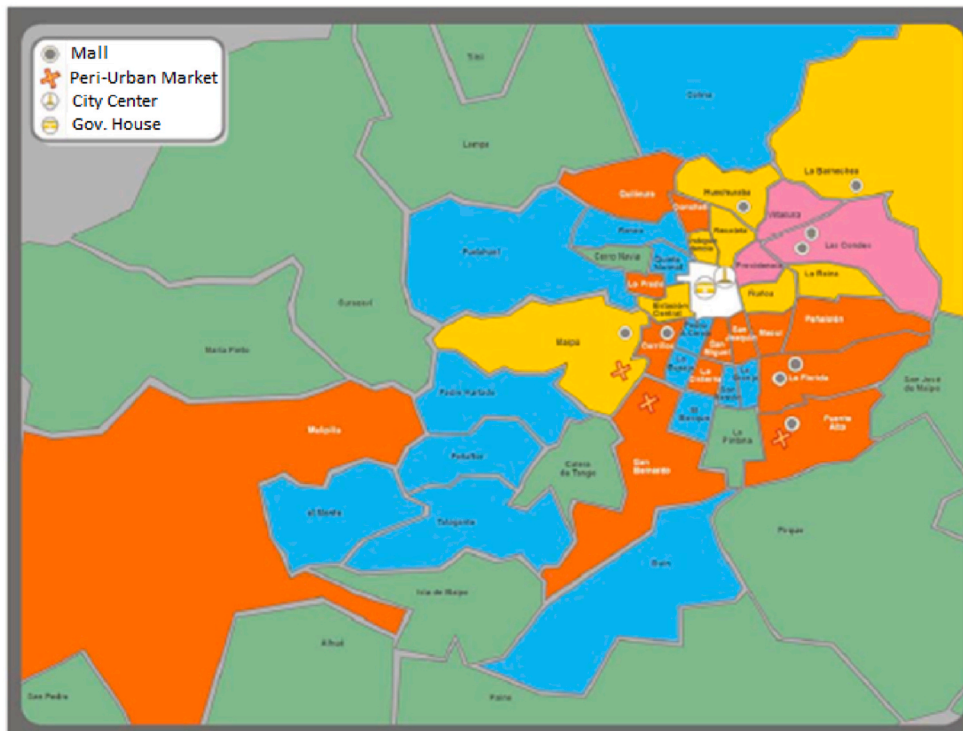


Fig. 4. Preference Elicitation Trade-off Game Figures

Note: This figure illustrates the trade off game that interviewees played in the field. The top panel shows the combination of housing quality attributes in terms of size and space distribution. Housing quality varies by varying size of the house. The bottom panel shows municipalities of the Metropolitan Region colored according to their average land price. Pink and Yellow colored municipalities are those with the highest land price, where the smallest size house can be located. In contrast, Green colored municipalities are those of lowest land price, where the biggest house can be located. Interviewees choose a combination of color and house which we use to construct our preference elicitation outcome variable. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

differences between 2008 housing subsidized and 2008 slum dwellers²⁰.

Networks. Differences in location decisions across slum and non-slum groups may be due to differences in the value that these groups assign to social networks. Desai (1994) argues that slums offer a network platform that is often essential to the poor's welfare. We examine this hypothesis by asking about the most important attribute of any given location. We find that only 5% of slum dwellers report "to be located close to family members" as either their first or second priority when choosing location, a somewhat similar number compared to their subsidized housing counterparts (3%). Moreover, "family networks" is ranked in importance below other dimensions like "to be located close to public transport and jobs" (43%), "close to schools" (42%), or "close to markets and city center" (9%), all of which suggest that family networks is not a first order interest for slum dwellers when choosing location.

3.3. Stated preferences for location

The location observed in the last section is a revealed preference for location quality that may be associated with unobserved attributes beyond wealth, labor force participation and closeness to city center. Hence, we elicit location preferences of both slum and subsidized housing dwellers through a trade-off game (Robinson et al., 1975; Dowall and Juhasz, 1978; Smith and Joseph, 1982). In particular, the interviewee has to choose one among multiple bundles of housing quality (land and house size) and location quality (degree of access to services and labor markets), with these bundles varying inversely across the two dimensions, that is, as housing quality increases location quality decreases. The game was designed to elicit the individuals' willingness to substitute housing quality for better location, which we interpret as a proxy for the strength of location preferences.²¹

In practice, the trade-off game works as follows. The interviewer presents the interviewee five different houses that vary by house/land size as well as a map of municipalities within the Metropolitan Region (RM) where these housing choices can be located (see Fig. 4). In the map, each municipality is colored according to the level of land price in that municipality. Municipalities in yellow are the richest, i.e., have a mean land price within the first quartile of the distribution of land prices (the top 3 richest municipalities are marked in pink as emphasis). In orange, blue, and green are the municipalities with a mean land price within the second, third, and fourth quartiles, respectively. The map also indicates the location of malls and peri-urban markets. Finally, Central

Santiago municipality is shown in white because land prices are extremely high, and thus it is not an admissible choice.

The interviewee faces a trade-off between a housing quality attribute (own a formal house with a given land size) and location (locate in an area with a given level of land price). As detailed in Fig. 4, there are five possible pair-choices (bundles) and interviewees can only choose one of them:

- Highest Land Price, but No Access to Formal Housing (Pink); or
- High Land Price, with 50 m² Formal House (Yellow); or
- Mid-High Land Price, with 60 m² Formal House (Orange); or
- Mid-low Land Price, with 70 m² Formal House (Blue); or
- Low Land Price, with 80 m² Formal House (Green).

Note that the bundles vary inversely across the two dimensions. The biggest house (80 m²) can be placed only in municipalities that have the lowest land price (Green), most of which are located far from the urban center and markets. On the other hand, choosing municipalities with, say, High Land Price, implies owning a smaller house of 50 m² (Yellow). We are interested in testing the extent to which slum dwellers prefer locations of higher land prices (at the cost of lower housing quality) compared to subsidized housing dwellers. In particular, we fit a multinomial logit model to the data and estimate differences in the probability of choosing Yellow locations (first best), Orange locations (second best), or Blue locations (third best) over the Green alternatives as the base outcome (poorest location).²² For each m alternative different than the base we fit the following model (equation (2)):

$$\Pr(y_i = m) = \frac{\exp(\beta_0 + \beta_1 \text{Slum}_i + X'_i \gamma)}{1 + \sum_{h>1} \exp(\beta_0 + \beta_1 \text{Slum}_i + X'_i \gamma)} \quad (2)$$

Results from this model are shown in Table 3. Model (1) presents marginal effects from the uncontrolled version of equation (2), while model (2) adds demographic covariates to the specification. First, we find that, relative to subsidized housing dwellers, the likelihood of choosing Yellow municipalities (first best in terms of location-quality) over Green municipalities (poorest location-quality) is higher for slum dwellers, with the effect being robust across models as well as to clustering the standard errors at the neighborhood level. This is consistent with the hypothesis that the willingness to substitute housing quality for better location is stronger among slum dwellers compared to subsidized housing dwellers. Second, as expected, the likelihood of choosing Orange (second best) over Green municipalities (poorest location-quality) is also higher for slum dwellers, yet the effect size is almost half in size relative to that of Yellow choice, and it is not robust to clustered standard errors. Third, we find that slum dwellers are less likely to choose the Blue municipalities (third best) than the Green municipalities (poorest location-quality). This might be due to a stronger trade off on housing quality given that both type of locations may be considered equally bad, i.e., slum dwellers are willing to sacrifice better location for better housing only if both location alternatives are equally unattractive on the land price dimension.

Heterogeneities. We examine how group differences in location preferences vary with housing and location attributes. For simplicity, we turned into a binary choice model. In particular, we estimate the prob-

²⁰ Of course, our test would not work if, for instance, slum dwellers are uninformed about the housing subsidies offered by the government. However, we believe the lack of information related to the existence and operations of the housing program is unlikely to be a big deal in the Chilean context. First, on housing and urban issues, slums formation is likely the biggest concern of the Chilean government, and it has been consistently in the top of the agenda for several decades, with most of the discussion focused on how to "eradicate the slums". In practice, the latter has implied several efforts on the part of MINVU (Ministry of Housing and Urbanicity) and NGOs to try to convince slum dwellers to take the housing subsidies and abandon the slums (TECHO is a good example of it). Slum dwellers are not invisibilized, and the media have made explicit efforts trying to communicate the housing benefits offered to slum dwellers. Second, slum dwellers are not isolated, atomic individuals unconnected from society. Indeed, slum dwellers are typically organized in neighborhood committees that collectively support the demand for housing rights. These organizations typically negotiate with the government their housing solutions, and are in charge of circulating information to their members about the opportunities available to formalize their housing status.

²¹ Trade-off games are considered a class of contingent valuation method that relies on a stated preference model where instead of asking the respondent to place a monetary value on goods or services, she is asked to choose between several hypothetical bundles of goods to determine their implicit valuation of a given good or service. See Robinson et al. (1975) for a seminal introduction to trade-off games, and Diamond and Hausman (1994) for a discussion of the utility of contingent valuation methods to elicit stated preferences.

²² There is a total of 1,589 households in the survey. Only the household head participated in this trade-off game. We have some missing observations that did not respond to this part of the survey, mostly due to time issues, as the survey was long-lasting and the game was shown at the end. The total number of observations included was 1,470, for a response rate of 92%. Only 3 individuals chose the Pink alternative, thus we dropped them from the analysis. For the other four alternatives the number of observations are 306 (Yellow), 379 (Orange), 430 (Blue), and 352 (Green). The results are robust to including the 3 Pink observations as part of the Yellow group. These results are available upon request.

Table 3

Probability of choosing a specific location: Marginal effects from a multinomial choice model.

Location Choices over Green location (Base):						
	Yellow		Orange		Blue	
	MFX	MFX	MFX	MFX	MFX	MFX
	(1)	(2)	(1)	(2)	(1)	(2)
Slum = 1	0.072*** (0.021) [0.062]	0.105*** (0.023) [0.063]	0.035 (0.023) [0.047]	0.065** (0.027) [0.052]	-0.086*** (0.024) [0.055]	-0.109*** (0.028) [0.062]
Observations	1,467	1,467	1,467	1,467	1,467	1,467
Mean Subsidized Housing	0.170	0.170	0.239	0.239	0.339	0.339

Notes: This table presents results from a multinomial logit of equation (2). We present the marginal effects (MFX) of residing in a slum on the probability of choosing the Yellow, Orange, or Blue location over the Green location, which is the base alternative and represents the location with the lowest land price, our proxy for location quality. Each marginal effects is interpreted as the increase/decrease in the likelihood of choosing an alternative over the Green alternative. Mean Subsidized Housing indicates the share of subsidized housing dwellers that chose each color location (17% chose Yellow, 24% chose Orange, 34% chose Blue, and 25% chose Green). Model (1) is the uncontrolled version of equation (2). Model (2) add controls variables for a quadratic polynomial of household head's age and years of schooling, sex, a binary indicator of whether the household lives in a house that is above the mean standardized score of housing quality, a binary indicator of whether the household head reports that her job is close to home (as oppose to far from home), and a binary indicator equal to one if the household has a below-the-mean standardized score of an index that indicates how far in minutes is the household from different amenities like supermarkets and city downtown. Robust standard errors are shown in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Also, standard errors clustered at the neighborhood level (the primary sampling unit from the 2008 survey design) are shown in brackets.

Table 4

Probability of choosing a "bad" location in a preference elicitation trade-off game: Probit marginal effects by dwelling type.

Dep. Var.: = 1 if chooses a "bad" location									
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Slum = 1	-0.106*** (0.025) [0.056]	-0.122*** (0.026) [0.054]	-0.071 (0.072) [0.082]	-0.085 (0.072) [0.082]	-0.103** (0.045) [0.075]	-0.116*** (0.044) [0.072]	-0.125*** (0.036) [0.060]	-0.141*** (0.036) [0.057]	-0.099 (0.089) [0.096]
Good Quality House = 1			-0.058 (0.070) [0.069]	-0.053 (0.069) [0.071]					-0.058 (0.070) [0.071]
Slum = 1 × Good Quality House = 1			-0.105 (0.078) [0.091]	-0.100 (0.078) [0.090]					-0.096 (0.079) [0.091]
HH's Job is Close = 1					0.011 (0.042) [0.039]	0.015 (0.042) [0.039]			0.006 (0.042) [0.039]
Slum = 1 × HH's Job is Close = 1					-0.004 (0.055) [0.065]	-0.007 (0.055) [0.064]			-0.010 (0.056) [0.060]
Close to Amenities = 1							-0.049 (0.038) [0.038]	-0.045 (0.039) [0.037]	-0.045 (0.039) [0.036]
Slum = 1 × Close to Amenities = 1							0.044 (0.052) [0.060]	0.045 (0.052) [0.059]	0.039 (0.053) [0.056]
Observations	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467
Controls	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Mean Subsidized Housing	0.590	0.590	0.590	0.590	0.590	0.590	0.590	0.590	0.590

Note: This table shows the results from the preference elicitation trade-off game. We present marginal effects from a Probit model where the dependent variable is equal to one if the household head chooses either Blue or Green areas ("bad" locations), and zero otherwise. The independent variable of interest is an indicator variable that equals to one if the household is currently living in a slum ($Slum = 1$), and zero otherwise. We interact this variable with a binary indicator of whether the household lives in a house that is above the within-group mean standardized score of housing quality (columns (3) and (4)); whether the household head reports that her job is close to home (as oppose to far from home) (columns (5) and (6)); and with a binary indicator equal to one if the household has a below-the-mean standardized score of an index that indicates how far in minutes is the household from different amenities like supermarkets, city downtown, among others (columns (7) and (8)). Mean Subsidized Housing indicates the share of subsidized housing dwellers that chose a "bad" location (either Blue or Green areas). The first regression in each case is the uncontrolled version of equation (3), and the second version adds controls variables for a quadratic polynomial of household head's age and years of schooling, and sex. The last column shows full regression including all interactions together. Robust standard errors are shown in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Also, standard errors clustered at the neighborhood level (the primary sampling unit from the 2008 survey design) are shown in brackets.

ability of choosing a bundle with “bad” locations (Blue, Green) versus “good” locations (Yellow, Orange) by running the following probit regression model (equation (3)):

$$\Pr(y_i = 1) = \Phi(\beta_0 + \beta_1 \text{Slum}_i + X_i' \gamma) \quad (3)$$

where y_i is equal to one if an individual i chooses either Blue or Green municipalities (i.e., “bad” locations), and zero if chooses either Yellow or Orange municipalities (i.e., “good” locations). Slum_i equals one if household i is a current slum dweller and zero if it is a subsidized housing dweller. We show simple mean differences and then adjust by the X_i vector of individual-level covariates, which includes a quadratic specification of age and years of schooling, and sex. Table 4 presents the results. On average, slum dwellers are 12 percentage points less likely to choose a “bad” location, which represents a 20% difference with respect to the share of subsidized housing dwellers that chose a bad location. The adjusted and non-adjusted differences are similar, which suggests that the comparison between groups is robust to the included controls. Also, the results are robust to clustering the standard errors at the neighborhood level in that we still reject the null hypothesis of no differences at conventional levels of statistical significance.

The next panels in the table show how the results vary with location and housing attributes. First, we construct a standardized score by adding up different attributes of the house: quality of floor, roof, and walls, and housing unit’s quality of utilities (electricity, drinkable water, and improved sewage). Specifically, since all the housing indicators are dummy variables, we sum these within observations and divide by the number of variables to create an average indicator of housing quality for each observation. We then take the within-group mean (i.e., a mean value for slum dwellers, and a mean value for subsidized housing dwellers), and generate a standardized housing quality index by subtracting the within-group mean and dividing by its standard deviation. We then code a dummy variable that equals to one if the score is above the mean (“good housing quality”), and zero otherwise. Considering only subsidized housing dwellers, we find that those with good housing quality are less likely to choose a bad location quality (in change of better housing quality) relative to those with non-good housing quality (column (4), Good Quality House = 1). We interpret this as subsidized housing dwellers having satisfied minimum housing conditions and thus sacrificing location quality for better housing is, on average, not utility maximizing. This rationale is even stronger for the case of slum dwellers, as the coefficient that accompanies the interaction term almost doubles in size (in absolute value).²³

Next, we code a binary indicator equal to one if the household head perceive that her job is “close to home” and equal to zero otherwise. The results in column (6) shows that subsidized housing dwellers that perceive their jobs are “close to home” (HH’s Job is Close = 1) are not more likely to sacrifice location to improve housing than subsidized dwellers that perceive the opposite. This is also the case of slum dwellers (interaction term is close to zero). However, among those who perceive their jobs are far from home, slum dwellers are 11 percentage points less likely to choose a “bad” location relative to their subsidized housing counterparts. This result suggests that location is more valuable for those who reside far from their jobs, yet this is only conditional on being a slum dweller (i.e., it does not apply for the case of subsidized housing dwellers).

²³ Note that the coefficient of the slum dummy is not meaningful at all here since the standardized housing quality index is based on within-group means that differ substantially across slum and subsidized housing groups. An alternative is to use the overall mean housing quality to standardize the summary index, but that strategy is implausible as differences in housing quality between slum and subsidized housing dwellers are so large that such a standardized variable leaves all slum dwellers below the mean and all subsidized housing dwellers above of it, not allowing for variation in the variable across groups.

Finally, we construct an index to proxy geographical proximity from the households to different amenities. Interviewees report the time in minutes that takes them to move from their house to the supermarket, their job, the city’s downtown, and their nearest relative. We add these together for each household and construct a standardized index that follows the same structure than the housing quality standardized index. We then construct a dummy variable that equals one if the score is below the mean (i.e., live closer to amenities) and zero otherwise.²⁴ Column (8) shows that subsidized housing dwellers who live closer to amenities are 4.5 percentage points less likely to choose a “bad” location than subsidized housing dwellers who live farther from them. We interpret this as subsidized housing dwellers having satisfied minimum location conditions and thus sacrificing housing quality for better location is, on average, not utility maximizing for them. This rationale is even stronger for the case of slum dwellers.²⁵ Moreover, among those who live far from amenities, slum dwellers are 14 percentage points less likely to choose a “bad” location relative to their subsidized housing counterparts. Finally, the coefficients in Table 4 remain stable when including all interactions, as is shown in column (9).

Overall, these results reinforce the hypothesis that the willingness to substitute housing quality for better location is stronger among slum dwellers compared to subsidized dwellers.

Location Stickiness. A potential threat is that the actual location where the interviewee resides can influence his location-housing bundle choice, in which case we would be in the presence of a “location stickiness” effect. That would be the case if individuals are more prone to choose colored areas that include their actual municipality of residence, even though other areas are much better to live in. If so, we could not identify whether the chosen bundle reveals the individual’s contingent valuation of location or it just reveals location stickiness effects. Hence, instead of analyzing whether slum dwellers are more (less) likely than subsidized housing dwellers to choose bundles with good (bad) locations, we estimate the probability of choosing a bundle with lower location quality compared to the location quality of the bundle to which the municipality of actual residence pertains to. In particular, we run the same probit regression model from equation (3), but now the dependent variable is equal to one if an individual i chooses an area of lower location quality relative to the area where she actually resides and zero otherwise. As is shown in Appendix Table A2, the effects size are somewhat smaller than those obtained from estimating the same probit model but using a naive definition of “bad” location as dependent variable (as in Table 4), but the sign of the coefficients are generally consistent. Overall, the latter suggests our results are robust to “location stickiness” effects.

4. Conclusion

In this paper, we empirically examine the extent to which slum dwellers are willing to substitute housing quality for location quality. To do so, we start examining a representative data on the 1960–2008 residential trajectories of slum dwellers and subsidized housing dwellers in

²⁴ We proceed as follows. First, we create dummies for whether the time in minutes is above or below the median time. Since all the time indicators are dummy variables, we sum these within observations and divide by the number of time variables to create an average indicator of geographical proximity to amenities for each observation. We then take the within-group mean (i.e., a mean value for slum dwellers, and a mean value for subsidized housing dwellers), and generate a standardized index by subtracting the within-group mean and dividing by its standard deviation. We then code a dummy variable that equals to one if the score is below the mean (“Close to Amenities”), and zero otherwise.

²⁵ This can be seen by summing the coefficients of the slum dummy and the coefficient of the interaction term, i.e., $-0.141 + 0.045 = -0.096$, which doubles the size of the coefficient that accompanies the “Close to amenities” dummy ($= -0.045$).

Santiago, Chile, where the provision of housing subsidies to disadvantaged groups has a long tradition that dates back to the early twentieth century. Our residential history data register information of the municipalities of residence of 2008 slum dwellers and 2008 subsidized housing dwellers in three periods of residence: birth, previous to current location, and current location. The data also include information about wealth, labor force participation and location within the city at the period-municipality level. We thus study whether the variation in the characteristics of the municipalities of residence over periods differ across slum and non-slum dwellers, which allows us to test whether slum dwellers have a stronger preference for better location relative to their subsidized housing counterparts.

Our results show that while both slum and subsidized housing dwellers are born in municipalities that are similar in terms of poverty, labor force participation, and location within the city, 2008 slum dwellers are more likely to have moved to relatively wealthier municipalities during their life. On average, these municipalities are more likely to be located within the inner city limits, have lower levels of poverty, and have higher levels of labor force participation. Indeed, we find that while 2008 slum dwellers show extremely poor housing conditions, they are more likely to be employed than their subsidized housing counterparts. Consequently, employment rates among slum dwellers are significantly higher.

Second, we implement a trade-off game aimed at eliciting stated preferences for location, and show that slum dwellers are less willing to substitute location quality for better housing. Our results are consistent with the hypothesis that slum dwellers follow strategic considerations of location choice that seek to optimize the access to better economic opportunities, even though this is at the cost of living in extremely poor housing conditions. This reinforces the hypothesis that the emergence of slums is not only explained by factors associated with poverty persistence, but also by group-specific location preferences.

Our results are in line with Barnhardt et al. (2017) who analyze how slum dwellers in Ahmedabad, India, respond to a housing program that randomly offered improved housing conditions but in the outskirts of the city. The authors find that only 68% of lottery beneficiaries took the program, suggesting that a non-negligible portion of slum dwellers are not willing to sacrifice their location quality to improve housing quality.

Moreover, the authors find that more than 30% of program takers eventually exit the program and returned to centrally located slums where access to economic opportunities was more expedite. Our results are also consistent with Brueckner et al. (2019)'s model of location-backyarding trade-off. The authors show that having a better location (e.g., closer to jobs) increases rents, which disincentivize backyard (housing) consumption on the part of the owner.

Bilal and Rossi-Hansberg (2019) suggest that in order to understand residential mobility decisions of individuals it is necessary to treat location as an asset. Their model proposes that the decision of where to live is part of a standard consumption-savings decision where different discount rates for the future may lead to different location choices today. In particular, buying more of the asset involves moving to better locations that cost more today but give better returns tomorrow, while selling the asset implies moving to cheaper locations with worse opportunities. In their model, poor people are "location sellers" that need to downgrade their location in order to smooth consumption, which favors segregation. Our results contradict their prediction. In particular, slum dwellers act in the opposite way, i.e., not as "location sellers" but as "location buyers" that persistently seek to upgrade their location-quality over time. Interestingly, from the lens of Bilal and Rossi-Hansberg (2019)'s model, slum dwellers' behavior is only possible if slum dwellers discount the future in a larger factor than other poor groups. Indeed, we hypothesize that this is precisely the underlying mechanism explaining their strong willingness to substitute housing quality for location quality, i.e., they sacrifice consumption today (housing quality) in order to get better returns tomorrow (resulting from accumulated wealth through access to better job opportunities).

Finally, our results have to be considered within the context of Chile, where the provision of housing subsidies to disadvantaged groups has a long tradition. Further research should test the validity of these results in alternative contexts with less inclusive housing policies. Likewise, understanding the housing-location trade-off requires more research oriented to study the evolution of location preferences over time, how these preferences interact with income gains, and what is the role of networks on location preferences, to name a few.

Table A.1
Descriptive Statistics for 2008 Slum and Subsidized Housing Dwellers

	2008 Slum Dwellers			2008 Subsidized Housing Dwellers			p-value for Mean Differences	
	Mean	Std. Dev.	N	Mean	Std. Dev.	N	p-value (robust std. err)	p-value (Std. Errclustered at neighborhood level)
<i>Panel A: Individual level characteristics</i>								
= 1 if Head is Male	0.500	0.500	3,178	0.482	0.500	3,256	0.139	0.072
Head's Age	25.242	18.221	3,178	27.109	18.748	3,256	0.000	0.013
Head's Years of Schooling	5.951	4.235	3,178	6.526	4.263	3,256	0.000	0.003
Head is Employed (=1)	0.573	0.495	2,056	0.537	0.499	2,252	0.017	0.060
Head is Unemployed (=1)	0.065	0.247	2,056	0.064	0.245	2,252	0.870	0.917
Head's Monthly Wage (\$CLP)	149,107	102,424	1,171	157,911	90,851	1,210	0.027	0.264
<i>Panel B: Household level characteristics</i>								
= 1 if poor	0.111	0.041	813	0.127	0.045	776	0.000	0.081
Household members	3.909	1.785	813	4.196	1.761	776	0.001	0.013
Members under 14 yrs old	1.380	1.203	813	1.294	1.171	776	0.148	0.250
= 1 if Head born in a slum	0.144	0.351	813	0.067	0.250	776	0.000	0.000

Notes: This table presents descriptive statistics for slum and subsidized housing dwellers in 2008. Panel A includes all households members, while Panel B is one observation per household. The last two columns show the *p*-value of the differences in means computed after an OLS regression of each variable against a binary indicator for whether the household is located in a slum or not. Penultimate column presents *p*-values calculated based on robust standard errors, and last column presents *p*-values calculated based on standard errors clustered at the neighborhood level, which is the primary sampling unit of the 2008 survey design.

Table A.2

Probability of choosing a “worse” location in a preference elicitation trade-off game: Probit marginal effects by dwelling type.

Dep. Var.: = 1 if chooses “worse” location relative to current location									
(1)	(2) (3) (4)			(5)		(6) (7)		(8)	(9)
Slum = 1	−0.048*** (0.024) [0.063]	−0.040 (0.024) [0.063]	−0.003 (0.066) [0.113]	0.003 (0.066) [0.112]	−0.085** (0.042) [0.075]	−0.077* (0.042) [0.075]	−0.016 (0.033) [0.067]	−0.008 (0.033) [0.067]	−0.003 (0.082) [0.120]
Good Quality House = 1			0.037 (0.063) [0.101]	0.035 (0.063) [0.100]					0.038 (0.063) [0.100]
Slum = 1 × Good Quality House = 1			−0.057 (0.072) [0.116]	−0.053 (0.072) [0.115]					−0.052 (0.072) [0.115]
HH's Job is Close = 1					0.036 (0.038) [0.036]	0.030 (0.038) [0.037]			0.035 (0.039) [0.037]
Slum = 1 × HH's Job is Close = 1					0.071 (0.051) [0.055]	0.068 (0.051) [0.056]			0.056 (0.052) [0.052]
Close to Amenities = 1							−0.064 (0.048) [0.057]	−0.061 (0.048) [0.056]	−0.047 (0.049) [0.054]
Slum = 1 × Close to Amenities = 1							0.020 (0.035) [0.035]	0.012 (0.035) [0.035]	0.020 (0.035) [0.035]
Observations	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467
Controls	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Mean Subsidized Housing	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320

Note: This table shows the results from the preference elicitation trade-off game. We present marginal effects from a Probit model where the dependent variable is equal to one if the household head chooses an area of lower location quality (“worse”) relative to the quality of her current location. The independent variable of interest is an indicator variable that equals to one if the household is currently (2008) living in a slum or not (*Slum* = 1). We interact this variable with a binary indicator of whether the household lives in a house that is above the within-group mean standardized score of housing quality (columns (3) and (4)); whether the household head reports that her job is close to home (as oppose to far from home) (columns (5) and (6)); and with a binary indicator equal to one if the household has a below-the-mean standardized score of an index that indicates how far in minutes is the household from different amenities like supermarkets, city downtown, among others (columns (7) and (8)). Mean Subsidized Housing indicates the share of subsidized housing dwellers that chose a “worse” location, i.e., an area of lower location quality relative to the quality of her current location. The first regression in each case is the uncontrolled version of equation (3), and the second version adds controls variables for a quadratic polynomial of household head's age and years of schooling, and sex. The last column shows full regression including all interactions together. Robust standard errors are shown in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Also, standard errors clustered at the neighborhood level (the primary sampling unit from the 2008 survey design) are shown in brackets.

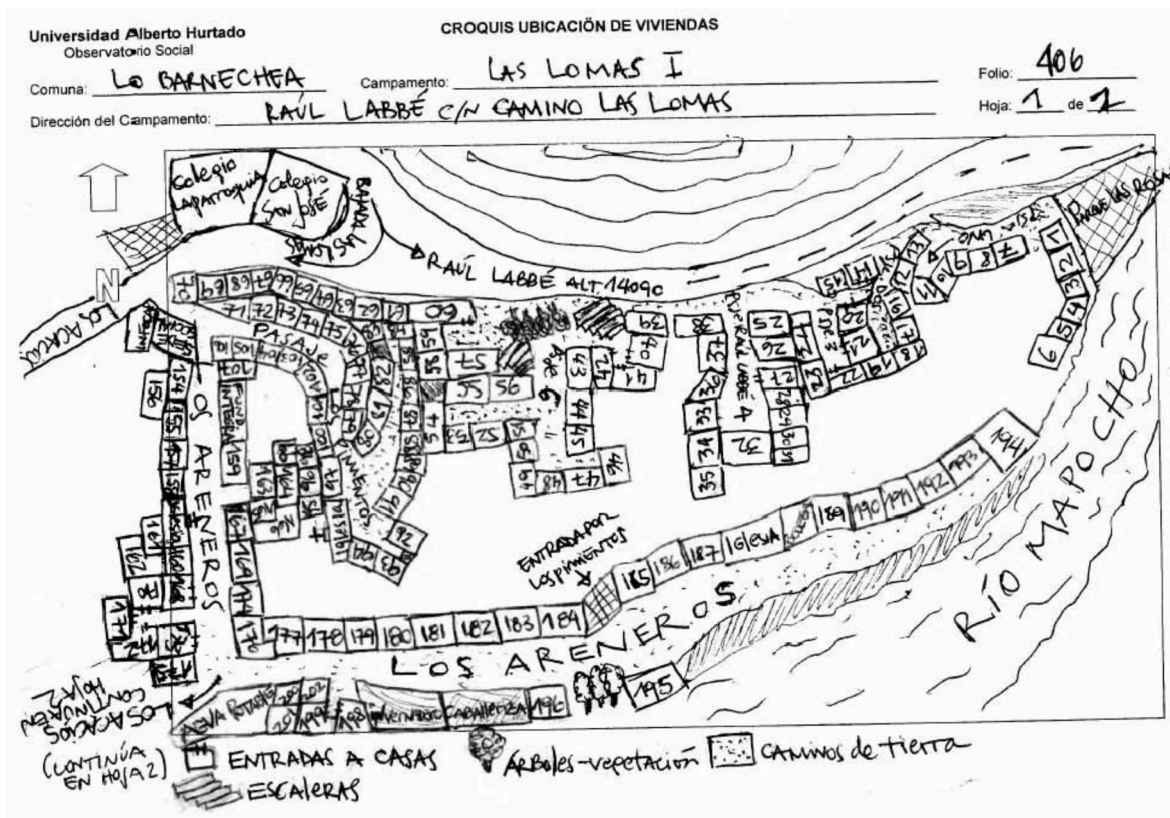


Fig. A.1. Example of a Map from a Slum in the Sample

Note: This figure shows the map of a slum draw by one of the interviewers. Before selecting a random sample of households within each slum, interviewers were sent to the field to make a listing of each household in each slum as well as a map to understand the geographical distributions and limits of each slum.

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Corrigendum

Corrigendum to “Location preferences and slum formation: Evidence from a panel of residence histories” [Reg. Sci. Urban Econ., 97 (November 2022) 103816]

Pablo Celhay^a, Raimundo Undurraga^{b,*}^a Escuela de Gobierno and Instituto de Economía, Pontificia Universidad Católica de Chile, Chile^b Departamento de Ingeniería Industrial, Centro de Economía Aplicada, Universidad de Chile, Chile

The authors regret “The objective of this corrigendum is to amend the omission of two key references from which the data, samples, images, and instruments used in the article were obtained and from which some of the research questions that motivated the article are derived.

The references are:

1. Brain and Prieto (2008). Living in Slums in Chile: A Path to a Formal House, a Way to Overcome Poverty, or a Location Strategy to Deal with Vulnerability? *Project funded by LILP*. Ref N. LIB 122007.
2. Brain, I., Prieto, J., & Sabatini, F., (2010). Vivir en Campamentos: ¿Camino hacia la vivienda formal o estrategia de localización para enfrentar la vulnerabilidad? *EURE Revista Latinoamericana de Estudios Urbanos Regionales*. 36 (109), pp. 111–141.

We acknowledge that the data, questionnaires, samples, residential history, and trade-off game in the article were obtained from research led by Brain and Prieto (2008) and funded by LILP. The references in the article are ambiguous in relation to the copyright of the data and instruments analyzed in the article.

We acknowledge that the article by Brain et al. (2010) is important because it is one of the first papers to highlight the potential role of location preferences in the decision to live in a slum, providing empirical evidence in the context of the Santiago metropolitan region in Chile. Celhay & Undurraga’s article revisits Brain and Prieto (2008) research, using different methodological strategies than Brain et al. (2010).

We acknowledge that we did not contact Joaquín Prieto and Isabel

Brain to request for a formal consent to use the research data, instruments, samples and images in their article, nor cite in the article the paper reporting the main results of this research (Brain et al., 2010), which led to misleading attribution regarding the origin of the research project.

We would like to thank Joaquín Prieto and Isabel Brain for accepting our apology for using the material generated in the research without their and LILP’s permission, and for omitting referencing it in our research.

The following are minimal corrections to the article that attempt to correct the copyright transgressions that occurred in the publication of the journal *Regional Science and Urban Economics*.

1. We declare that the data used in this paper (in particular the questionnaires, samples, residential history modules and the trade-off game) originate from the research project “Living in Slums in Chile: A Path to a Formal House, a Way to Overcome Poverty, or a Location Strategy to Deal with Vulnerability?” Brain and Prieto, 2008 (financed by LILP. Ref N. LIB 122007).
2. The reference to Brain et al. (2010) was not included in the hypothesis stated in paragraph 1, page 1: “A hypothesis is that slum dwellers are low income people with strong preferences for geographical access to better labor opportunities, i.e., they are willing to live close to the city centre to the detriment of housing quality and access to basic services (Brain et al. (2010))”.

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* Corresponding author.

E-mail address: raimundo.undurraga@dii.uchile.cl (R. Undurraga).

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3. It is clarified that the source and ownership of Figure 2 panels (a) and (b) on page 11 and Figure A.1 on page 17 is the Brain and Prieto (2008) project. It should therefore read: “Living in Slums in Chile: A Path to a Formal House, a Way to Overcome Poverty, or a Location Strategy to Deal with Vulnerability?” Brain and Prieto, 2008 (financed by LILP. Ref N. LIB 122007).
4. Footnote 7 on page 3, which reads “The survey was implemented by Observatorio Social at Universidad Alberto Hurtado (OSUAH) in 2008 where one of the authors worked at the time and led the survey design, fieldwork data collection, and analysis”, is deleted because it contains inaccuracies that make it appear that one of the authors is responsible for the project, when this is not the case.
5. Include omitted references in the “References” of the article.
 - a. Brain and Prieto (2008). Living in Slums in Chile: A Path to a Formal House, a Way to Overcome Poverty, or a Location Strategy to Deal with Vulnerability? Project funded by LILP. Ref N. LIB 122007.
 - b. Brain, I., Prieto, J., & Sabatini, F., (2010). Vivir en Campamentos: ¿Camino hacia la vivienda formal o estrategia de localización para enfrentar la vulnerabilidad? *EURE Revista Latinoamericana de Estudios Urbanos Regionales*. 36 (109), pp. 111–141.

The authors would like to apologise for any inconvenience caused.