Displacement and Mortality: Evidence from a Slum Clearance Program*

Fernanda Rojas-Ampuero

University of Wisconsin-Madison

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Abstract

This paper examines the relationship between forced displacement and adult mortality. I use evidence from a slum clearance program which required slum dwellers to relocate to public housing in low-income areas. I estimate a displacement effect that compares families relocated to new housing projects on the periphery of the city with slum-dwellers who received housing at their original location. Displaced individuals are 5% less likely to survive 40 years after the intervention and experience a reduction in longevity of 2.5 years. Displaced adults who survive to age 65 have lower pensions, live in higher poverty areas, and are more likely to report a disability. The evidence on mechanisms suggests that mortality risk is higher among those relocated to more peripheral neighborhoods and those whose slum-community networks were disrupted.

Keywords: slum clearance, mortality, segregation, neighborhood effects, forced relocation

*Rojas-Ampuero, University of Wisconsin-Madison (rojasampuero@wisc.edu). I thank Dora Costa, Michela Giorcelli, and Adriana Lleras-Muney for their continual support and guidance throughout this research project. I also thank Susan Godlonton, Sara Lowes, Elisa Macchi, Laura Schechter, Mahvish Shaukat, Jeffrey Smith, Lisa Tarquinio, Miriam Venturini, and participants in various seminars and conferences for helpful comments. I thank Lucas García for his careful work as a research assistant in this project. I also thank Nicolás Figueroa for sponsoring me with Chile's Ministry of Social Development. I acknowledge support from a Stone Research Grant from Harvard Kennedy School's James M. and Cathleen D. Stone Program in Wealth Distribution, Inequality, and Social Policy. This research uses information from the Registry of Social Information (RIS). I thank the Undersecretary of Social Evaluation, owner of the RIS, for the authorization to use the databases under the provisions of Exempt Resolution No. 412, of 2019. All the results of this study are my sole responsibility and interpretation and do not commit said Undersecretary in any way.

1 Introduction

A large literature documents that low-income individuals have worse health outcomes than high-income individuals, and that adults in poor areas die younger than adults in wealthy areas (Chetty et al., 2016; Lleras-Muney et al., 2024). Establishing whether these gradients reflect a causal effect of location on health, or the sorting of less healthy individuals into worse places, is difficult because residential location is endogenous (Deryugina and Molitor, 2021). In low- and middle-income countries, these patterns may be exacerbated when the supply of neighborhoods available to low-income households is limited and housing policy concentrates new construction in peripheral areas (Barnhardt et al., 2016; Belchior et al., 2024).

Prior work has addressed the identification problem by studying individuals forced to relocate, for example due to natural disasters (Deryugina and Molitor, 2020; Nakamura et al., 2022). However, forced displacement changes several things simultaneously: the quality and location of the new neighborhood and the composition of social networks (Bryan et al., 2025). Isolating these channels requires variation not only in whether individuals are displaced, but also in the characteristics of where they are sent.

I use evidence from a large-scale government housing program in Chile to provide causal estimates of the effect of forced displacement on adult mortality. Between 1979 and 1984, Chile's Ministry of Housing implemented the Program for Urban Marginality (*Programa para la Marginalidad Urbana*), a large-scale slum clearance and urban renewal program affecting more than 5% of the population of Greater Santiago. Prior to the program, slums were distributed throughout the city, including in central municipalities. The program produced two types of intervention. When urban conditions permitted, slums were upgraded in place: families received new housing units in their original location and remained in their original neighborhoods (non-displaced). When upgrading was not feasible—because the slum was too dense, on hazardous land, or in a municipality where land was too valuable—families were evicted and relocated to new public housing projects built predominantly on the city's periphery (displaced).

Both groups received similar housing units, but in different locations. As a result, displaced families received units that were 5% cheaper and had no say in their destination: assignment to specific peripheral projects was determined by which units were available at the time of eviction. Displaced families ended up in municipalities that were, on average, 2.26 kilometers farther from the central business district, had 2.3 fewer years of average longevity, and had higher unemployment rates than the locations of non-displaced families.

I construct a novel dataset linking archival records of slum dwellers to death certificates, pension records, and administrative earnings data, and follow 29,242 adults for forty years after the intervention. Following Rojas-Ampuero and Carrera (2026), who study the same program and its effect on children, I exploit identifying variation at two levels. First, I compare displaced and non-displaced adults from slums with the same estimated probability of relocation, using the physical and geographic characteristics of each slum that determined whether it was cleared and relocated. Second, within the displaced sample, I exploit variation across families in distance to the city center and in the share of their original slum community sent to the same destination project—both determined by housing availability rather than by family characteristics.

Displacement significantly increases the risk of mortality. Displaced adults die at a rate 23.4% higher per year than non-displaced adults, translating into a 6% lower survival rate forty years after the end of the program. The effect on annual mortality is approximately three times larger for men than for women, and individuals with weaker family networks—those who were single or childless before treatment—face an even higher mortality risk.

The mortality effect spans the full age distribution but is most pronounced after age 45. Using age-specific estimates, I compute a displacement effect on expected longevity: on average, a displaced individual dies 2.4 years younger than a non-displaced adult. Conditioning on survival to age 65, displacement reduces longevity by 1.4 years—a magnitude comparable to findings in Bauer et al. (2019), who study forced relocation following World War II, and Black et al. (2015), who study the impact of the Great Migration on longevity in the United States.

Displacement also reduces residential mobility, with persistent effects on families' locations. Immediately after the program, displaced families were resettled in lower-quality areas farther from the city center, with higher unemployment and fewer health care services. These disadvantages persist. Thirty years later, displaced adults who have survived remain in their municipality of assignment, have not returned to their municipality of origin, and live in neighborhoods that are 3.4% poorer than those of non-displaced individuals.

Displacement also affects employment and earnings. Displaced adults have self-funded pensions that are 22.5% lower than those of non-displaced retirees, reflecting longer spells of informal employment or unemployment over the lifecycle. Subsidized pensions are correspondingly higher among displaced retirees, partially offsetting the gap in social security contributions and narrowing the pension difference from −22.5% to −4.5%.

To shed light on mechanisms, I examine which characteristics of destination neighborhoods explain the observed variation in adult mortality. Greater distance from the city center and fewer health care facilities in destination areas both increase the risk of dying after age 65. The disruption of slum-community networks is also positively associated with elevated mortality risk. Together, changes in neighborhood characteristics account for approximately 30% of the displacement effect on long-term mortality, while network disruption—in the form of split communities and greater distance from original locations—accounts for approximately 60%. All together they explain about 80% of the total effect.[1] These results are robust to controlling for wealth differences across treatment groups arising from the differential location of housing units.

I also estimate displacement effects by cause of death. Displacement raises mortality risk across all cause categories, but the effects are largest for cardiovascular disease, internal diseases (including diabetes and chronic respiratory disease), and external causes (accidents and violent deaths). Notably, while cancer is the leading cause of death in the Chilean population over the past two decades, it exhibits the smallest displacement effect—likely consistent with displacement disproportionately affecting causes tied to social determinants of health and chronic conditions, such as respiratory disease, diabetes, and hypertension. Among men, the risk of dying from external causes is 58% higher for the displaced than the non-displaced, accounting for approximately 25% of the total displacement effect on male annual mortality.

This paper contributes to several strands of literature. First, it relates to the lit-

[1] The percentages should not be summed, as some covariates are collinear, and their combined effect on the displacement coefficient may therefore be offset.

erature on forced displacement and socioeconomic outcomes. A large body of work examines labor market effects on both receiving populations and displaced individuals (e.g., Bauer et al., 2013; Becker et al., 2020; Nakamura et al., 2022).[2] A growing literature documents that forced displacement harms long-run health: studies of World War II refugees in Germany and Finland find that forced migration increases mortality (Bauer et al., 2019; Haukka et al., 2017), and Valenzuela-Casasempere (2026) estimates the effect of infrastructure-induced displacement on longevity. My setting provides exogenous variation in whether families were displaced, where they were sent, and whether their community was kept together, allowing me to study mechanisms including network disruption. I also observe mortality across the full age distribution, enabling analysis of both short- and long-run effects.

Second, a growing literature for the developing world examines the impact of housing policies on household outcomes. Barnhardt et al. (2016), Picarelli (2019), Kumar (2021), Belchior et al. (2024), and Bryan et al. (2025) study effects on labor market outcomes, while Currie et al. (2025) examines health gains from moving to better neighborhoods in Colombia. To my knowledge, this paper is the first to study the health consequences of relocating low-income families from central to peripheral urban locations, and is thus informative about the long-term costs of building public housing on the urban periphery.

Finally, this paper contributes to the literature on the causal effect of location on health (Deryugina and Molitor, 2021). Deryugina and Molitor (2020) use Hurricane Katrina to show that moving to a higher-quality area reduces mortality, and Finkelstein et al. (2021) exploit migration patterns of Medicare beneficiaries to decompose area-level variation in health spending and mortality. I contribute to this literature by studying the other side of the same coin: the health costs of being forced into lower-quality neighborhoods, in the context of a developing country.

The rest of the paper is organized as follows. Section 2 describes the historical background and the program. Section 3 explains the data collection process, and Section 4 presents the empirical framework. Section 5 presents baseline results on mortality and pensions. Section 6 discusses mechanisms, and Section 7 concludes.

[2] See Becker and Ferrara (2019) for a comprehensive review of the forced displacement literature.

2 Slum Clearance Program 1979-1984

By the late 1970s, in Greater Santiago approximately 15% of the metropolitan population resided in informal settlements known as *campamentos* — squatter settlements lacking basic infrastructure including drinking water, electricity, and sewage (MINVU, 1979). These settlements were not confined to any particular part of the city; they were dispersed across all municipalities, from high-income areas in the northeast to low-income peripheral zones in the south and west. Following the onset of the Pinochet dictatorship in 1973, the formation of new settlements was effectively prohibited by military force, concentrating pressure on the existing stock of informal housing.[3]

Between 1979 and 1985, Chile's Ministry of Housing and Urban Development (MINVU) implemented the Program for Urban Marginality (*Programa para la Marginalidad Urbana*), a large-scale clearance and urban renewal initiative. The program's coordinators sustained that the most direct route out of poverty was homeownership (Murphy, 2015): by making slum dwellers owners of formal housing units, regardless of where those units were located, the government intended to end the informal settlement crisis. At the program's outset in 1979, MINVU conducted a census of informal settlements and identified 340 to be cleared. By 1985, between 40,000 and 50,000 families had participated, accounting for roughly 5% of the population of Greater Santiago (Molina, 1986; Morales and Rojas, 1986). The average housing unit cost US$10,148, and the program's annual cost averaged US$63 million, approximately 0.25% of Chilean GDP in 1982.[4]

The program operated through two distinct interventions, determined at the level of the slum rather than the individual household. When the physical and legal conditions of a site permitted urban renewal, MINVU upgraded the settlement in place: the land was regularized, basic services were connected, and families received a formal housing unit at or very near their original location. These families — referred to throughout as *non-displaced* — accounted for one-third of program participants. When on-site renewal was not feasible, families were evicted and relocated to new public housing projects elsewhere in the city. These families — referred to as *displaced* — accounted for the remaining

[3]From 1973 to 1990, Chile was governed by a military dictatorship under Augusto Pinochet. The slums studied here originated as land seizures between 1960 and 1973.

[4]Computation based on archival data on average home values and subsidies. The figure is comparable to estimates in Molina (1986) and to current expenditure on homeownership subsidies in Chile.

two-thirds. In both cases, all families in a given slum received the same treatment, and all became homeowners of a formally titled dwelling.

For non-displaced families, on-site renewal took one of two forms. In some cases, the slum land was subdivided and each household received a plot on which a "starting-kit unit" was constructed — a minimal structure comprising a living room, bathroom, and kitchen, intended as a base to which families could add bedrooms over time.[5] In other cases, families received apartments in small housing blocks constructed close to the original site. In both cases, new neighborhoods were connected to the municipal water, electricity, and sewage networks, transitioning residents from informal to formal urban status while maintaining their existing location and social ties.

For displaced families, the process was more abrupt. MINVU evicted residents from their slums, cleared the land for other uses, and relocated families to newly constructed public housing projects.[6] These projects were built predominantly on the urban periphery, in municipalities at the margins of the metropolitan area. At the time of relocation, many destination neighborhoods lacked adequate public transportation, schools, and health care facilities — in part because they had been recently incorporated into the metropolitan boundary from former rural land (Molina, 1986; Aldunate et al., 1987). Families received either a house or an apartment in these projects and became their legal owners, subject to repayment of a copay over 12 or 25 years.

Figure 1 illustrates the spatial transformation produced by the program. Panels (a) and (c) map the locations of slums in 1979, showing that informal settlements were distributed across the metropolitan area with no strong geographic concentration. Panels (b) and (d) map the public housing projects built to receive program participants by 1985. The contrast is stark: housing projects for displaced families (purple) are concentrated on the periphery of the metropolitan area, while projects for non-displaced families (blue) remain in more central locations. The gray-scale shading, representing the concentration of formal employment, makes visible an important consequence of peripheral siting: displaced families were moved away from the employment centers that

[5] A starting-kit unit comprised a living room, bathroom, and kitchen. Families were expected to add bedrooms incrementally.

[6] All families were subject to eviction; households that declined the subsidy were excluded from the program. Social workers who accompanied the eviction process reported that refusal was extremely rare, as participation represented most families' only realistic path to homeownership.

had been accessible from their original, more centrally located slums.

Survey evidence collected shortly after the program's completion corroborates that families impressions aligned with the quality of their new neighborhoods. Aldunate et al. (1987) interviewed 592 displaced families relocated to four destination neighborhoods and found that, while residents generally rated their new housing units as better than the slums they had left, they rated their new neighborhoods as worse. Specifically, they reported reduced access to employment, transportation, schools, and health care services, and perceived their new surroundings as more dangerous and provided with fewer public amenities (see Appendix Figure A.2).

Financing followed a uniform structure across both interventions. The government provided a direct subsidy intended to cover 75% of construction costs, capped at 200 UF.[7] Families were responsible for the remainder through monthly installments to MINVU. Housing units across both groups were comparable in physical quality and size — the program's design explicitly provided equivalent dwellings regardless of intervention type — but their market values differed because peripheral land was cheaper. In the data, housing units received by displaced families were valued approximately 13% below those received by non-displaced families, reflecting location rather than construction quality.

A feature of the program that is central to the identification strategy is how displaced families were assigned to specific destination projects. Decisions about where to send families were made centrally by MINVU and were determined by which projects happened to have available units at the time of each eviction, not by the characteristics of the families being relocated.[8] Families could not influence their assignment, and destination municipalities had no authority to accept or reject relocated households.[9]

[7]UF (*Unidad de Fomento*) is a Chilean inflation-indexed unit of account published by the Central Bank. The average home value in the sample is 254 UF, equivalent to approximately US$10,148 in 2023.

[8]Housing projects were not designed to house the residents of any particular slum. Assignment was determined by which units happened to be available at the time of each eviction. Social workers interviewed by the author confirmed this account.

[9]Municipalities could not influence the program's implementation in their territories. As Labbé et al. (1986) explain, "municipalities have not had a direct responsibility regarding the location and quantity of the displaced families, as construction and relocation did not have to be approved by the municipality of destination." Santiago lacked a citywide government; the 30 local municipalities managed their own territories, but citywide housing policy was set at the central government level. Under the Pinochet dictatorship, all local-level authorities were appointed by the regime, ensuring that central directives were uniformly followed (González et al., 2021).

One consequence of this availability-based assignment is that families from a single slum were sometimes split across multiple destination projects. When this occurred, the social network of the original community was fragmented — some neighbors were relocated together, others to different locations across the city.

The decision to displace a slum, rather than upgrade it in place, reflected physical characteristics of the slum site. Factors that made on-site renewal infeasible included proximity to flood-prone rivers or canals, location on steeply sloped terrain, excessive density relative to available land area, and uncertainty over land tenure (Rodríguez and Icaza, 1998). Land value also played a role: slums occupying high-value land in more central municipalities were more likely to be cleared, since the market value of the site made redevelopment for other purposes attractive. As Rodríguez and Icaza (1998) note, relocation decisions reflected "the reputation of the municipality, their land values, and the speculation about future prices," which explains why evictions were disproportionately common in higher-income, more central areas of the city.

Two examples illustrate how these criteria operated in practice. In the case of Las Palmeras, a slum in a low-income municipality, MINVU initially planned on-site renewal. By 1981, however, it became clear that the site's density made it impossible to subdivide the land into plots of sufficient minimum size. The settlement was reclassified for displacement, and in late 1983, its residents were relocated to a newly built neighborhood on the municipal outskirts; the former slum site was converted into a park (Murphy, 2015). A second case involves slum dwellers along the Mapocho River, a flood-prone corridor running through central Santiago. After the river flooded in 1982, more than 3,000 families from three settlements—El Ejemplo, El Esfuerzo, and El Trabajo—located in Las Condes, a high-income municipality, were relocated to La Pintana and San Ramón, two low-income municipalities in the southern periphery of the city.

Table 1 compares the pre-program characteristics of displaced and non-displaced slums using data from Morales and Rojas (1986) and MINVU's slum censuses. Columns (1) and (2) report means for each group; column (3) reports the raw difference. Consistent with the selection criteria described above, displaced slums were denser — more families per hectare — and more likely to be located near rivers or canals and in areas with higher flooding risk. They were also, on average, approximately one kilometer closer to the central business district (CBD), reflecting the pattern of central-area clearances. By contrast, the census districts in which displaced slums were located had slightly higher average schooling levels and property values, consistent with their more central locations. Panel A also shows that displaced slums were less likely to have names with military connotations, suggesting lower alignment with the dictatorial regime.[10]

3 Data

The building of the dataset relies on the original data construction from Rojas-Ampuero and Carrera (2026), which I complement with additional administrative data sources. I construct a novel dataset that tracks slum dwellers who became homeowners, their slums of origin, and their destination neighborhoods. I link individual household records to birth, marriage, and death certificates to construct mortality outcomes and family demographics, and to pension and earnings records to study labor market outcomes.[11]

3.1 Archival Data: Slums and Homeowners

I draw on two slum censuses conducted by MINVU in 1979 and 1980, which record slum names, locations, and destination projects. These data allow me to classify each slum as displaced or non-displaced and to identify the destination neighborhood of each family. I complement them with information compiled by Molina (1986) and Morales and Rojas (1986), who assembled a comprehensive list of slums, locations, and destination neighborhoods by treatment status and year.

To construct the sample of program participants, I collect and digitize archival records from the Regional Housing and Urban Planning Service and historical records held by the Municipality of Santiago.[12] These records list the homeowners and their spouses who received a property deed through the Program for Urban Marginality. I focus on households in Greater Santiago located in municipalities where both displaced and

[10] In Panel A of Table 1, slum names are classified as military-related if they reference a military historical event, including the September 11, 1973 coup, or the names of national military heroes.

[11] The Supplementary Material in Rojas-Ampuero and Carrera (2026) provides a detailed description of the data construction process and variable definitions.

[12] Each region of Chile has a Regional Housing and Urban Development Service (SEREMI), subordinate to MINVU, responsible for implementing housing policy at the local level.

non-displaced slums are observed.[13] The archival search yielded 19,365 unique households from 14 municipalities of origin. Based on figures reported by Molina (1986), approximately 27,500 families received housing in the Greater Santiago area through the program, so the 19,365 families in my sample represent 70.4% of all recipients, corresponding to 34,505 adults across 98 slums.

The archival records contain the names and national identification numbers (NIDs) of property deed recipients and their spouses, as well as their new addresses. Records are organized by year of eviction or urban renewal and by destination project, and I link them to their slum of origin using the 1979 slum census. I drop individuals with missing NIDs, which arise from transcription errors or outdated identification numbers that could not be validated using contemporaneous sources.[14] Of the 19,365 archival records, 16,268 correspond to households (31,869 adults) in which at least one partner has a valid NID, representing 59% of total program recipients.

A concern with the missing-NID records is that they cannot be linked to mortality or earnings outcomes. To characterize the resulting selection, Appendix Table B.1 compares individuals in the full archival sample (columns (1)–(4)) with those in the non-missing NID sample (columns (5)–(8)). Because full names are observed, I can identify gender, head-of-household status, Mapuche last name (an indicator of indigenous origin), and number of partners per record. The table shows slightly higher proportions of women and Mapuche last name among displaced families relative to non-displaced, and a marginally higher share of couples relative to single-person records. The attrition rate due to missing NIDs is lower among displaced than non-displaced individuals (5.3% versus 12.3%), and the non-missing NID sample is balanced by gender but contains more couples among the non-displaced. Importantly, no entire slum is lost from the sample. The observed selection reflects missing NIDs being more prevalent among men, older individuals, and those without a partner—all characteristics that may correlate with mortality. I correct for this attrition in the robustness checks section and show that the baseline mortality results are almost unchanged.

[13] I exclude rural municipalities, which predominantly received displaced families.

[14] NID validation draws on 2016 electoral records and children's birth certificates.

3.2 Death, Marriage, and Birth Certificates

I link individuals with valid NIDs to death, marriage, and birth certificates from Chile's National Registration Service, accessed through the Ministry of Social Development through 2023. Death certificates record date of death, municipality of death, and cause of death. Birth certificates provide parent-child links and dates of birth.[15] Marriage certificates are used to identify spouses not present in the archival records and to track marital status after treatment.

3.3 Earnings, Employment, and Pension Data

I link individuals to two administrative data sources containing information on labor market outcomes and pensions.

Social Household Registry (RSH). The RSH (*Registro Social de Hogares*) is an information system managed by the Ministry of Social Development, used to assess household needs and eligibility for social and governmental benefits covering income, housing, and education. By 2023, approximately 90% of Chilean households had voluntarily registered. I have access to biannual data from June 2007 to December 2023, which includes self-reported income, employment status, informal employment, self-reported pensions, family composition, and dwelling characteristics. A limitation of this dataset is that coverage begins only in 2007; matching rates therefore reflect differential pre-2007 mortality between displaced and non-displaced individuals.

Pensions. The Chilean pension data are managed by the Superintendence of Pensions. I observe monthly records from 2014 to 2023 reporting pensioner status, total social security contributions, self-funded pension amounts, and complementary or subsidized pensions for workers with low or zero pre-retirement contributions. The dataset also includes disability pensions claimed before retirement age.

[15] The sample of 16,268 records with non-missing NIDs was assembled using marriage certificates and children's birth certificates.

3.4 Municipality and District Attributes

I measure location attributes—including education and employment—at the municipality and census-district level using the 1982 Census of Population and Vital Statistics. I combine these with records from the Ministry of Health on hospitals and primary health care centers (PCHCs) per municipality, available for 1985 or earlier. I further supplement this dataset with average municipal mortality rates for 1985 from Chile's National Institute of Statistics (INE).

4 Empirical Strategy

4.1 Identification of the Displacement Effect

To estimate the impact of forced displacement on adult mortality, I exploit the fact that treatment was determined at the slum level rather than on the basis of individual family characteristics. The empirical strategy compares displaced individuals with non-displaced individuals from slums with the same probability of relocation.

Under the assumption that the slum characteristics determining treatment are observed, I can estimate the probability of a slum being cleared and relocated as a function of its urban attributes. Comparing outcomes within sets of individuals sharing the same propensity score ensures that any differences between the displaced and non-displaced groups are attributable to the eviction process and subsequent relocation to a new project site. I estimate the following linear model:

$$Y_i = \alpha + \beta \, Displaced_{s\{i\}} + \psi_o + p(X_s) + \psi_o \times p(X_s) + X_i'\theta + \varepsilon_i, \qquad (1)$$

where Y_i is a long-run outcome for individual i, such as average monthly pension or neighborhood poverty rate. $s(i)$ indexes individual i's slum of origin, and $Displaced_{s\{i\}}$ equals one if the individual lived in a displaced slum and zero otherwise. ψ_o are municipality-of-origin fixed effects, controlling for initial differences across families in slums located in different municipalities. $p(X_s)$ is the propensity score for the probability of slum s being cleared and relocated, estimated as a function of slum characteristics X_s. The specification also includes a vector of baseline individual and family characteristics at the time of intervention, X_i, including gender, year-of-birth fixed effects, head-of-household status, marital status, indigenous last name, number of children, slum-level average formal employment before treatment, and year-of-intervention fixed effects (1979–1984) to absorb aggregate temporal differences across the five years of the program. Standard errors are clustered at the slum-of-origin level. The coefficient β estimates the difference in long-run outcomes between displaced and non-displaced individuals with similar probabilities of relocation.

To estimate the impact of displacement on annual mortality, I extend this model following Deryugina and Molitor (2020). The data are organized as a yearly panel from the year of treatment through 2023, and the corresponding equation is:

$$Died_{it} = \alpha + \beta\, Displaced_{s\{i\}} + \psi_o + p(X_s) + \psi_o \times p(X_s) + \phi_t + X_i'\theta + \varepsilon_{it}, \qquad (2)$$

where $Died_{it}$ equals zero if individual i survived through year t and one if the individual died in year t; observations are set to missing in all years following death. All variables are defined as in equation (1), with the addition of ϕ_t, calendar-year fixed effects that extend from the first year of intervention through 2023. The coefficient β estimates the difference in annual mortality between displaced and non-displaced individuals with similar probabilities of relocation over the forty years following treatment.

Equations (1) and (2) implement propensity score matching at the slum level, which requires a first-stage estimate of the propensity score function (Abadie and Imbens, 2016). The specification can be interpreted as a control function approach in which $p(X_s)$ and its interactions with ψ_o are included directly to allow for greater flexibility (Busso et al., 2014). Robustness to alternative propensity score implementations is discussed in Section 5.6.

4.2 Propensity Score Estimation

To estimate the probability of clearance and relocation, I follow Rojas-Ampuero and Carrera (2026). I first estimate the propensity score on the full sample of program slums, then apply the fitted values to my archival sample of 98 slums. This approach improves statistical power and corrects for the non-random selection of slums into the archival records.

The propensity score is estimated using data from Morales and Rojas (1986), complemented with information from Molina (1986). This is the most comprehensive dataset covering the universe of program slums, comprising 231 slums with non-missing characteristic data. I estimate the probability of relocation using a LASSO-logit model, allowing the model to select among the following slum characteristics: density (families per hectare), military name, elevation, slope, flood risk, census-district education, census-district unemployment, and number of schools per census district. LASSO selects density, military name, elevation, and census-district average schooling as determinants of relocation. As expected, displaced slums have higher propensity scores than non-displaced slums (Appendix Figure B.1, panel (a)), and the common support is wide, including nearly the entire distribution between 0.05 and 1.

Applying these estimates to the archival sample of 98 slums yields a common support between 0.1 and 0.78 (Appendix Figure B.1, panel (b)). The average relocation probability remains higher for displaced than for non-displaced slums, though the gap is smaller than in the full sample, as the propensity score distributions are more similar across treatment groups in the archival sample. To account for the non-random composition of the archival records, I reweight each slum by the inverse probability of appearing in the archives (Appendix Figure B.1, panel (c)).[16] These weights are used as a robustness check in subsequent sections.

4.3 Propensity Score Implementation

I implement the propensity score method in three steps. First, I estimate $\hat{p}(X_s)$ at the slum level using the LASSO-logit model described above and apply the fitted values to the archival sample. Second, I impose common support: based on the propensity score densities by treatment group (Appendix Figure B.1, panel (b)), I retain slums with $0.1 < \hat{p}(X_s) < 0.78$, leaving 95 of the 98 archival slums in the estimation sample; the three excluded slums are all displaced slums with high flood risk. Third, I estimate equation (2), entering $\hat{p}(X_s)$ as a continuous control and interacting it with municipality-of-origin fixed effects ($\hat{p}(X_s) \times \psi_o$), so that identification comes from com-

[16]See Appendix C for a full description of the weight estimation procedure.

paring displaced and non-displaced individuals within the same municipality with similar relocation probabilities.[17]

4.4 *Evaluation of the Identification Strategy*

The identification assumption requires that the decision to displace a slum was uncorrelated with family characteristics, conditional on the slum's relocation probability. To evaluate this, I compare baseline demographics of displaced and non-displaced adults at the time of intervention, conditioning on the full set of propensity score and municipality-of-origin fixed effect interactions.

Panel A of Table 2 reports summary statistics for baseline demographics within the common support sample. Columns (1) and (2) report means for the non-displaced and displaced groups, respectively. The sample includes adults aged 18–80 at the time of treatment with a non-missing NID. On average, individuals are 35 years old; 54% are women; 35% live in a household with a female head; they have 2.2 children on average, with 16% having no children; 47% were not born in Greater Santiago; and average formal employment in the slum of origin is 40%. The last two rows of Panel A report pre-treatment child mortality: 1.8% of adults had a child die before age 1, and 2.3% had a child die before age 5 in the five years preceding treatment.

Column (3) reports conditional differences between treatment groups, adjusting for the propensity score and municipality-of-origin fixed effects ($\hat{p}(X_s) + \psi_o + \hat{p}(X_s) \times \psi_o$). After this adjustment, displaced and non-displaced individuals are statistically indistinguishable on 10 of 13 baseline characteristics. Among the three variables with significant differences, the magnitudes are small: displaced individuals are 2.6 percentage points less likely to be married or have a partner present—a difference attributable to the higher rate of missing NIDs among non-displaced men (Appendix Table B.1)—and 1 percentage point more likely to have a Mapuche last name, though the share of indigenous individuals in the sample is small. Displaced individuals also have lower measured education, though this variable is drawn from post-2007 administrative records and is subject to selection bias; it should therefore be interpreted with caution. The last row of Panel A

[17] A stricter approach would implement a block propensity score by municipality of origin (Heckman et al., 1998). This is not feasible in my data, as it would require a substantially larger number of slums per municipality.

reports the p-value of a joint significance test across all 13 demographics, finding no statistical evidence that displacement is jointly predicted by household characteristics.

Columns (4)–(6) and (7)–(9) repeat the analysis separately for women and men. The conclusions are similar to those for the full sample. Women are less likely to be married than men, but there is no disproportionate age difference between genders. Treatment-group differences are comparable to the full-sample results, and the joint p-values show no evidence that displacement is predicted by household demographics for either gender.

Panel B of Table 2 describes mortality patterns in the sample. By 2023, 40% of individuals have died, with no significant difference between treatment groups; however, displaced individuals die 2.6 years younger on average. As expected, the share of men who have died by 2023 exceeds that of women (47% versus 34%), though the age-at-death gap between displaced and non-displaced is larger among women. Notice however, that these raw differences do not adjust for cohort composition or baseline demographics.

Panel C reports matching rates to administrative data. Overall, 82% of adults match at least once with the RSH and 73% with pension records. Matching rates to the RSH are similar across treatment groups, but displaced individuals are 4.5 percentage points less likely to appear in the pension data—likely reflecting higher pre-retirement mortality. Conditional on surviving to age 65, however, the pension-data matching rate exceeds 98% and is nearly identical across groups. RSH matching rates are higher among women, who are more likely to apply for social benefits, but pension-data matching rates show no gender differences conditional on survival to age 65.

5 Main Results

5.1 *Displacement Effect on Location Attributes*

I begin by documenting that displaced families were relocated to lower-quality areas relative to non-displaced families. Table 3 presents estimates of the displacement effect in column (1), with column (2) reporting the mean for the non-displaced group. Panel A reports estimates of equation (1) on location characteristics measured between 1982 and 1985, following relocation and redevelopment. The results show that displaced families were relocated 2.256 kilometers farther from the Central Business District (CBD)—

19.7% farther than non-displaced families, who remained in their original locations. This is consistent with the evidence in Figure 1, which shows that displaced slum-dwellers were housed on the periphery of Santiago.

Displaced families were also relocated to lower-quality areas along multiple dimensions. Relative to non-displaced families, the destination municipalities of displaced individuals exhibit lower life expectancy by 2.309 years, lower average schooling by 0.966 years, and a higher unemployment rate by 5.2 percentage points. Displaced families also had access to fewer primary care health centers (PCHCs) and fewer hospitals. Consistent with relocation to lower-quality neighborhoods, displaced families were assigned to areas with lower property values, and their homes were worth 1.6% less than those of non-displaced families, though this estimate is not statistically distinguishable from zero. Importantly, the housing infrastructure was comparable across both treatment groups regardless of location (see Appendix Figure A.1).

Panel B of Table 3 shows that, between 2016 and 2023, displaced families continued to reside in lower-quality neighborhoods. While there are no longer significant differences in life expectancy across municipalities, displaced households live in neighborhoods that are 3.7% poorer than those of non-displaced individuals. Displacement also reduced residential mobility: displaced households are 29.8 percentage points less likely to have returned to their municipality of origin, though they are equally likely as non-displaced households to have remained in their municipality of assignment.

Taken together, these results indicate that displaced households did not return to their neighborhoods of origin. A likely explanation is the homeownership structure of the program, which prohibited families from selling their homes until the full purchase price had been paid, which varied between 12 and 25 years. I find suggestive evidence consistent with this mechanism (see Appendix Table A.2). Using data covering 40% of families assigned to neighborhoods in the northern areas of Santiago, I examine the probability of selling. Only 5% of these families had sold their home by 2019—on average 27 years after assignment—with no statistically significant differences between displaced and non-displaced families.[18]

[18] This dataset was provided by Santiago's Real Estate Registrar and linked to my sample using residential addresses.

5.2 Displacement Effect on Mortality

I estimate the average displacement effect on annual mortality using equation (2). Results are reported in Table 4, where the displacement coefficient is multiplied by 100 and thus interpreted in percentage points.

Panel A, column (1) reports the baseline displacement effect. Displacement increases average annual mortality by 0.228 percentage points, a result that is statistically significant at conventional levels and economically large, representing a 23.4% increase in annual mortality relative to non-displaced individuals. Column (2) restricts the sample to individuals who survive to age 65, for whom the displacement effect rises to 0.53 percentage points—a 20.2% increase in the risk of dying relative to the non-displaced group. Column (3) repeats the exercise for survivors to age 75; the effect grows further in levels to 0.79 percentage points, though it is smaller in relative terms (16.3%), as average mortality rises with age.

To characterize the dynamics of the displacement effect, panel (a) of Figure 2 plots the average displacement effect on annual mortality since the year of treatment. The effect is positive and statistically significant in the first years after displacement and grows over time as the cohort ages. Panel (b) shows the cumulative displacement effect: after 40 years, displaced individuals are 6 percentage points less likely to have survived. As time passes and all adults in the sample eventually die, this cumulative effect will converge to zero.

The increasing cumulative effect suggests that displacement shortens lives. To investigate this, I compute survival rates by age separately for each treatment group. Panel (c) of Figure 2 shows that displaced and non-displaced adults have similar survival rates through age 40, after which displaced individuals exhibit a persistently lower survival rate that widens with age. Panel (d) plots the difference between the two survival curves—that is, the displacement effect on the survival rate by age—and shows that this gap peaks at age 85 before narrowing as non-displaced individuals begin dying at higher rates.

These survival curves can be used to estimate the displacement effect on expected lifespan. The area between the two curves in panel (d) corresponds to the difference in expected longevity between displaced and non-displaced individuals.[19] Column (4) of Table 4, Panel A reports this estimate: displaced adults die, on average, 2.438 years younger than non-displaced individuals. This effect exceeds estimates reported in prior work on migration and mortality (e.g., Black et al., 2015; Bauer et al., 2019; Deryugina and Molitor, 2020). However, most of that literature relies on elderly samples observed after retirement. For a better comparison, columns (5) and (6) condition on survivors to age 65 and 75, respectively. Among those surviving to 65, displaced individuals die 1.426 years younger; among those surviving to 75, the gap is 0.95 years. These estimates are broadly comparable in magnitude to those in Black et al. (2015) for the Great Migration of Black Americans and Bauer et al. (2019) for World War II refugees in Germany.

Panels B and C of Table 4 decompose the results by gender. The effect of displacement on annual mortality (columns (1)–(3)) is more than twice as large for men as for women, and statistically different from each other (see row labeled "p-value"), though it is positive and increases with age for both groups. The effects on expected longevity (columns (4)–(6)), however, are similar across genders, despite women living longer on average. Figure 3 illustrates this pattern, plotting the displacement effect on cumulative mortality by age separately for women (purple) and men (green). Both groups experience elevated mortality risk due to displacement beginning around age 50, but the male effect is more than twice as large and peaks at age 75, while the female effect rises sharply after age 65 and peaks at age 85. In sum, displacement shortens the lives of both men and women, but the timing and magnitude of the effect differ by gender.

5.3 Displacement Effect on Mortality by Demographic Groups

I now explore whether displacement effects on mortality differ across demographic subgroups. Motivated by prior literature documenting elevated mortality risks among individuals with weaker social networks or lower education, I examine whether these characteristics predict heterogeneous displacement effects. Results are reported in Figure 4, separately for women in panel (a) and men in panel (b).

The figure plots displacement effects on annual mortality stratified by baseline demographic characteristics, and the patterns align with prior literature. I find larger

[19] Expected lifespan equals the area under the survival curve in panel (c) of Figure 2; the difference between the two curves therefore identifies the displacement effect on expected longevity.

displacement effects among single and childless adults; for women, the difference across groups is statistically significant. Importantly, this does not imply that the mortality effect among married individuals or parents is zero—it is in fact positive and statistically significant for both groups. These results indicate that individuals with fewer social ties at baseline face an even greater mortality risk due to displacement. When investigating differences by education, I find that the mortality effect among women appears to be driven primarily by those with lower predicted schooling at baseline. Among men, the displacement effect is positive regardless of education level, but lower education predicts a larger effect on annual mortality.[20]

5.4 Displacement Effect on Pensions, Employment, and Family Characteristics

Ideally, I would estimate displacement effects on employment and earnings immediately after treatment. This is not possible in my setting, as income data are only available from 2007 onward; however, I have access to pension records from 2014 to 2023. Pension data provide a useful measure of formal social security contributions and, by extension, income from formal employment. In the Chilean system, total pension income can be decomposed into three components: (1) a self-funded pension, drawn directly from a worker's social security contributions; (2) a subsidized pension, consisting of a lump-sum transfer to individuals with very low or zero contributions; and (3) a complementary pension, a subsidy that varies with component (1) and tops up component (2) for individuals whose contributions are positive but insufficient for a basic standard of living, with the transfer decreasing in (1).

Panel A of Table 5 presents displacement effects on all three pension components for individuals matched to the pension data. Displaced individuals receive self-funded pensions that are 22.5% lower than those of non-displaced individuals, consistent with longer spells of informality or unemployment over the lifecycle. I find smaller but positive displacement effects on the subsidized and complementary pensions, suggesting that the Chilean system partially offsets low social security contributions. Combining all three components, displaced individuals receive CLP$3.964 less per month in total pension

[20] I use a machine learning model to predict years of schooling for individuals in my sample, using all variables in Table 2 as predictors and the 1982 Population Census—which records years of education alongside baseline demographics—as the input data.

income, a gap of 4.5% relative to non-displaced adults. These results carry important implications: displacement reduces lifetime social security contributions and retirement pensions, but the Chilean pension system partially counteracts this difference, leaving displaced adults at pension levels closer to those of non-displaced individuals. This conclusion is, however, conditional on survival to retirement age—as documented earlier, approximately 20% of adults in my sample do not survive to age 65.

The last two rows of Panel A show that displaced individuals are 2.3 percentage points more likely to claim a disability pension before retirement age. While small in absolute terms, this represents a 56% higher likelihood relative to non-displaced adults.

Panel B of Table 5 shows that among individuals who survive to age 65, displaced individuals are 2.7 percentage points more likely to be employed, and 1.8 percentage points more likely to have a formal contract. Nevertheless, displaced individuals do not earn higher wages in the formal sector and, consistent with this, they rely more heavily on welfare after age 65 in about 10% (last row of Panel B).

Panel C of Table 5 reports displacement effects on family demographics following treatment. Displaced individuals have more children after treatment, though the increase in fertility is small and equal to 0.056 children. Consistent with the results on mortality, displaced individuals are more likely to be widowed, but do not re-marry more than non-displaced. By 2023, displaced adults live in slightly larger households, with an estimated effect of 0.037 additional family members—likely driven by additional children in the household, though the magnitude is very small.

Taken together, these results show that displaced adults who survive to age 65 retire with lower pensions, rely more on welfare, and are more likely to be widowed.

5.5 Attrition

I discuss how the two stages of attrition in my sample may affect the mortality estimates. My final sample—individuals with non-missing NIDs for whom I estimate a displacement effect—is subject to two sources of attrition: incomplete recovery of slums in the archival records, and loss of observations for individuals without a valid NID.

5.5.1 *Attrition in Archival Records*

To account for missing slums, I reweight the archival sample by the inverse probability of a slum appearing in the archival records, stratified by treatment status, so that the reweighted propensity score densities by treatment resemble those of the full slum population. Panel (c) of Appendix Figure B.1 shows that the reweighted densities assign greater weight to slums with a high probability of treatment—precisely those least likely to be recovered from the archives.

Appendix Table B.2 reports the reweighted displacement effects on annual mortality. The estimates are very similar to the baseline: displaced individuals die at a rate 0.15 percentage points higher per year, a 20% increase relative to non-displaced adults. This is closely in line with the results in Panel A of Table 4.

5.5.2 *Attrition Due to Missing NIDs*

To account for individuals with missing NIDs, I reweight each observation by the inverse probability of having a missing NID, estimated via a logit model as a function of gender, number of partners in the archival data, female head of household, and Mapuche last name. As discussed in the data section, individuals with missing NIDs are more likely to be non-displaced single men. If single men face higher mortality than other demographic groups, the baseline displacement effect is an upper bound, making this reweighting exercise particularly important.[21]

The results are reported in Panel B of Appendix Table B.2. The displacement effects are somewhat attenuated but remain economically large and statistically significant. Displaced individuals exhibit a higher annual mortality rate of 0.18 percentage points, or 22.6% above the non-displaced mean. The effect is larger for men than for women, with corresponding percent increases of 27% and 20%, respectively. These estimates are similar to the main results throughout.

[21] An alternative approach would be to compute Lee bounds. I prefer inverse probability reweighting because the outcome variable is binary, which avoids the need to select a trimming proportion based on a random subsample.

5.6 Robustness Checks

I show that the baseline displacement effect on annual mortality is robust to alternative propensity score methods and different parametric models.

Appendix Table A.5 reports robustness checks on the propensity score specification. The estimates are very similar to the baseline when using inverse probability score reweighting. Restricting the common support to the 5–95 and 10–90 percentile ranges of the propensity score distribution yields comparable results, as does dropping the three municipalities with limited propensity score overlap between treatment groups. Across all of these exercises, the displacement effect on annual mortality remains stable.

The mortality results are also robust to parametric methods. Appendix Figure A.4 plots Kaplan-Meier survival functions by treatment group since the year of intervention. Displaced individuals exhibit a higher risk of dying—equivalently, a lower probability of surviving—relative to non-displaced individuals, and I reject equality of the two survival functions. Appendix Figure A.5 presents the analogous figure by age, showing that displaced individuals die younger and again rejecting equality of survival functions across treatment groups. These estimates are comparable to those from the linear model in equation (2).

Finally, to account for any selection on unobservables that the propensity score method cannot address, I use data from the 1980 slum census, which contains information on original assignment to treatment. Unfortunately, this is only available for 1980–1984. I use the original assignment as an instrument for displacement: around 20% of slums originally assigned to be redeveloped on-site were instead cleared and relocated. I find very similar mortality results using either the propensity score or the instrumental variable approach (see Appendix Table A.6).

6 Mechanisms

I investigate the mechanisms behind the baseline mortality results. Drawing on families' impressions following relocation and the lower-quality attributes of destination neighborhoods documented before, I examine how changes in locations induced by displacement correlate with individual mortality. I then turn to the displacement effect on mortality by cause of death.

6.1 Movers' Long-Term Mortality

Displacement through relocation, as opposed to in-situ redevelopment, implied several changes in location attributes. As shown in previous sections, displaced households experienced deterioration in neighborhood quality, including reduced proximity to the CBD and fewer health care facilities. Displacement also disrupted community ties, as some slum communities were split and resettled in neighborhoods located in different municipalities or far from their original locations. To assess whether these changes account for the increased mortality risk among displaced adults, I follow Deryugina and Molitor (2020) and Carrillo et al. (2023).

Figure 5 correlates displaced individuals' annual mortality after age 65 with the change in location attributes experienced at relocation.[22] This exercise is motivated by the fact that displaced households did not choose their destination locations. Moreover, I do not find that movers' demographic characteristics systematically predict their final destinations (see Appendix Table A.7).

The correlations presented in Figure 5, shown as yellow circles, control for baseline demographics, municipality-of-origin fixed effects, and the estimated propensity score. Panel (a) shows that movers' mortality correlates positively with distance to the CBD: individuals relocated one kilometer farther from the CBD relative to their origin face a 0.013 percentage point higher annual risk of dying after age 65. For comparison, gray triangles show annual mortality of displaced adults predicted using the demographics of non-displaced individuals before treatment; this predicted mortality shows no correlation with changes in distance to the CBD. Panel (b) shows a comparable pattern for access to primary care health centers: displaced individuals whose destination municipality has one more PCHC than their origin experience a 0.097 percentage point lower annual mortality risk.

The results in panels (a) and (b) suggest a role for neighborhood quality, but the estimates are noisy and community disruption may also matter. I therefore repeat the

[22] I present results for individuals who survive to age 65 because the panel dataset contains fewer zeros and coefficients are more precisely estimated. Results are similar but more attenuated for the full sample.

exercise using the slum network share as a proxy for disruption rather than neighborhood change. The network share is defined as the proportion of slum dwellers from a given slum relocated together to the same project site; for non-displaced individuals, this share is always 100%. Panel (c) shows a negative correlation between mortality and network share: displaced adults who moved with their entire slum community to a new public housing site have an annual mortality rate after age 65 that is 0.7 percentage points lower, a difference that is statistically significant at 5% level.

The patterns in Figure 5 suggest that both neighborhood change and community networks contribute to variation in the annual mortality of displaced individuals, but they do not quantify their total contribution to the displacement effect. I therefore augment equation (2) with covariates capturing the changes in location attributes experienced by relocated families. Results are reported in Table 6. Column (1) reproduces the baseline displacement effect from column (2) of Table 4. Because these location changes are experienced only by relocated families, the coefficients on these covariates are identified from variation in outcomes among forced movers.

Column (2) shows that displaced individuals relocated farther from the city center die at a rate 0.045 percentage points higher per year per additional kilometer. Households experiencing a reduction in the number of health centers also face a higher mortality risk after age 65, particularly when destination municipalities have fewer hospitals. Including the change in the average municipal mortality rate between destination and origin yields a positive but small and statistically insignificant coefficient. Overall, the location-change covariates carry the expected signs and, importantly, reduce the displacement effect from 0.530 to 0.371—a 30% reduction—consistent with a meaningful role for place effects.

Column (3) replaces the neighborhood quality proxies with network share and distance from origin, which more directly capture disruption experienced by relocated families. A larger network share reduces mortality risk, while greater distance from the origin slum increases long-run mortality. These variables reduce the displacement effect by 57% ($1 - 0.227/0.530$), suggesting that network disruption and physical distance from origin are important mediators of the displacement effect on mortality.

Column (4) includes all covariates jointly. Some of these variables are likely correlated with one another—for instance, distance to the CBD and distance from origin—so isolating the effect of each would require additional assumptions. The results are nonetheless informative about the relevant mediators: access to hospitals, the disruption of community networks and proximity to origin are strong predictors of annual mortality after age 65. Including all covariates reduces the displacement effect by 80%, indicating that the changes induced by relocation account for a large share of the mortality gap between displaced and non-displaced individuals.

One remaining concern is that the analysis does not directly account for differences in home values between groups. As discussed in Section 2, families received comparable housing infrastructure regardless of treatment status. However, because of the locations in which these units were built, they may have appreciated differently over time, so that displacement could partly reflect differential wealth accumulation.[23] Column (5) of Table 6 addresses this by directly controlling for home value (measured in UF). The correlation between home value and mortality is small and statistically insignificant, yet its inclusion reduces the residual displacement coefficient to near zero and strengthens the estimated relationships between mortality and place effects—particularly distance to the CBD and hospital access. This result underscores that even conditional on wealth, proxied by home value, neighborhood attributes are strong predictors of the elevated mortality risk among displaced households.

6.2 Displacement Effect by Cause of Death

To shed further light on mechanisms, I examine whether displacement has differential effects across causes of death. Death certificates record cause of death as free-text strings, which I clean and validate against administrative data from Chile's Ministry of Health. I classify causes of death into five categories: cancer; cardiovascular diseases (hypertensive heart disease, hypertensive kidney disease, cerebrovascular diseases, atherosclerosis, and other circulatory diseases); internal causes (diabetes, influenza, pneumonia, chronic lower respiratory disease, chronic liver disease, and cirrhosis); external causes (accidents, suicides, homicides, and other external causes); and a residual category comprising causes

[23] Appendix Figure A.3 shows that property values in relocation areas trended below those in in-situ upgrading areas, with the largest gaps emerging after thirty years.

not falling into the previous four groups, including missing causes.[24]

Table 7 reports estimates of equation (2) on annual mortality by cause. Panel A presents results for the full sample. Displacement increases mortality across all cause categories, but the effects are most pronounced for cardiovascular, internal, and external causes, and smallest for cancer. Relative to non-displaced adults, displacement raises cardiovascular mortality by 23.7%, internal-cause mortality by 21.1%, and external-cause mortality by 50.8%. The increase in cancer mortality, while statistically significant, is the smallest in percent effect across categories, but still large.

Cardiovascular and internal causes encompass conditions such as hypertensive heart disease, hypertensive kidney disease, diabetes, chronic lower respiratory disease, and chronic liver disease and cirrhosis—conditions that could closely tied to social determinants of health, which may explain the disproportionate displacement effect on these categories. External causes, by contrast, relate to accidents and violence. While the data do not allow a more granular breakdown, the elevated external-cause mortality may reflect higher exposure to violence in destination areas or reduced access to transportation infrastructure increasing the risk of transit accidents.

Panels B and C decompose these results by gender. Among women, displacement raises mortality primarily through cardiovascular and internal diseases. Among men, these causes also dominate, but external causes of death contribute meaningfully to the total effect: they account for approximately 25% of the cumulative displacement effect on male mortality. Furthermore, external causes drive mortality among younger men, while other causes become more prominent at older ages (Appendix Figure A.7, bottom panels).

Appendix Table A.3 reports the main causes of death for the Chilean population by sex in 2001 and 2018. Cancer is the leading cause, followed by cardiovascular disease, internal causes, and external causes. Comparing these population-level patterns with my estimates confirms that displacement raises mortality across all four categories, with the excess risk concentrated in cardiovascular, internal, and external causes. These patterns are consistent with an income effect (Lleras-Muney et al., 2024). The particularly large increase in external-cause mortality among men may additionally reflect more adverse

[24]These categories are not mutually exclusive, as some death certificates list several causes of death without a strict ordering.

environmental and occupational conditions following relocation, as displaced households reported longer commuting times and reduced access to employment in destination areas (Appendix Figure A.2).

7 Conclusions

This paper studies the long-term mortality effects of a housing policy that displaced approximately 5% of the population of Greater Santiago during the Pinochet dictatorship. Slum-dwelling families were relocated to the periphery of the city, with relocation decisions made at the slum level and destination assignments outside families' control. This allows me to compare the mortality and pensions of displaced and non-displaced adults who resided in slums with similar ex-ante probabilities of relocation.

Displaced adults face a 23.4% higher annual probability of dying relative to non-displaced adults, a statistically significant effect for both men and women, resulting in a 6% lower survival rate forty years after the intervention. Among those who survive to age 65, displaced individuals receive lower self-funded pensions, rely more heavily on welfare, and live in higher-poverty neighborhoods than their non-displaced counterparts.

The mechanism analysis points to income segregation and social isolation as key drivers of the mortality effect. Destination neighborhoods of lower quality—farther from the CBD and with fewer health care facilities—are associated with elevated mortality risk among displaced individuals, consistent with worse access to labor markets and lower-quality employment. Yet neighborhood characteristics alone do not fully account for the displacement effect. The disruption of slum-community networks and greater distance from origin explain an even larger share of the total mortality effect, underscoring the role of social ties in shaping long-run health outcomes.

The displacement effect on mortality also varies by sex and cause of death. Displaced individuals face elevated mortality risk across all cause categories, but displaced men are disproportionately affected by external causes, including accidents and violent deaths.

This paper contributes to the growing literature on the provision of public housing for low-income families and its consequences for long-term outcomes. While prior work has concentrated on employment and earnings, this paper shows that the effects extend to long-run health. Displacement harmed health in part because destination neighborhoods were of lower quality, but the manner of relocation mattered too: families resettled alongside their communities experienced significantly lower mortality risk, suggesting that preserving social networks served as a protective buffer against the adverse effects of displacement.

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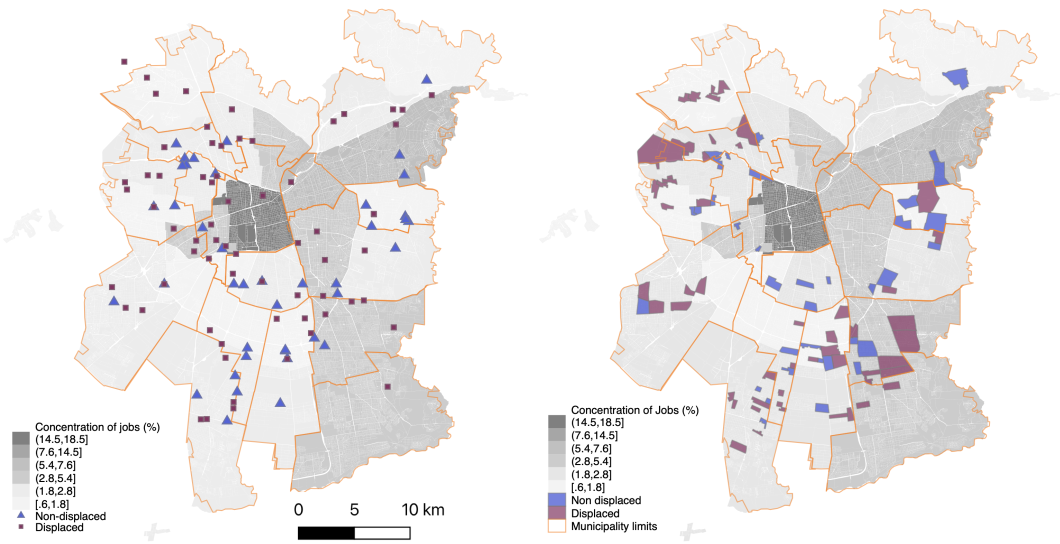
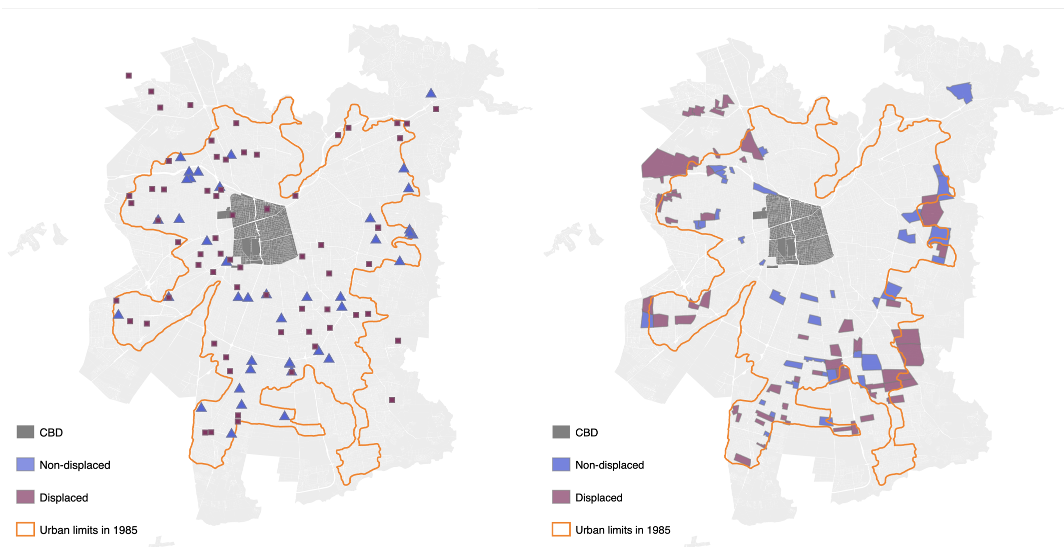
Figures and Tables

Figure 1: Eviction policies 1979–1985: Location of families living in slums



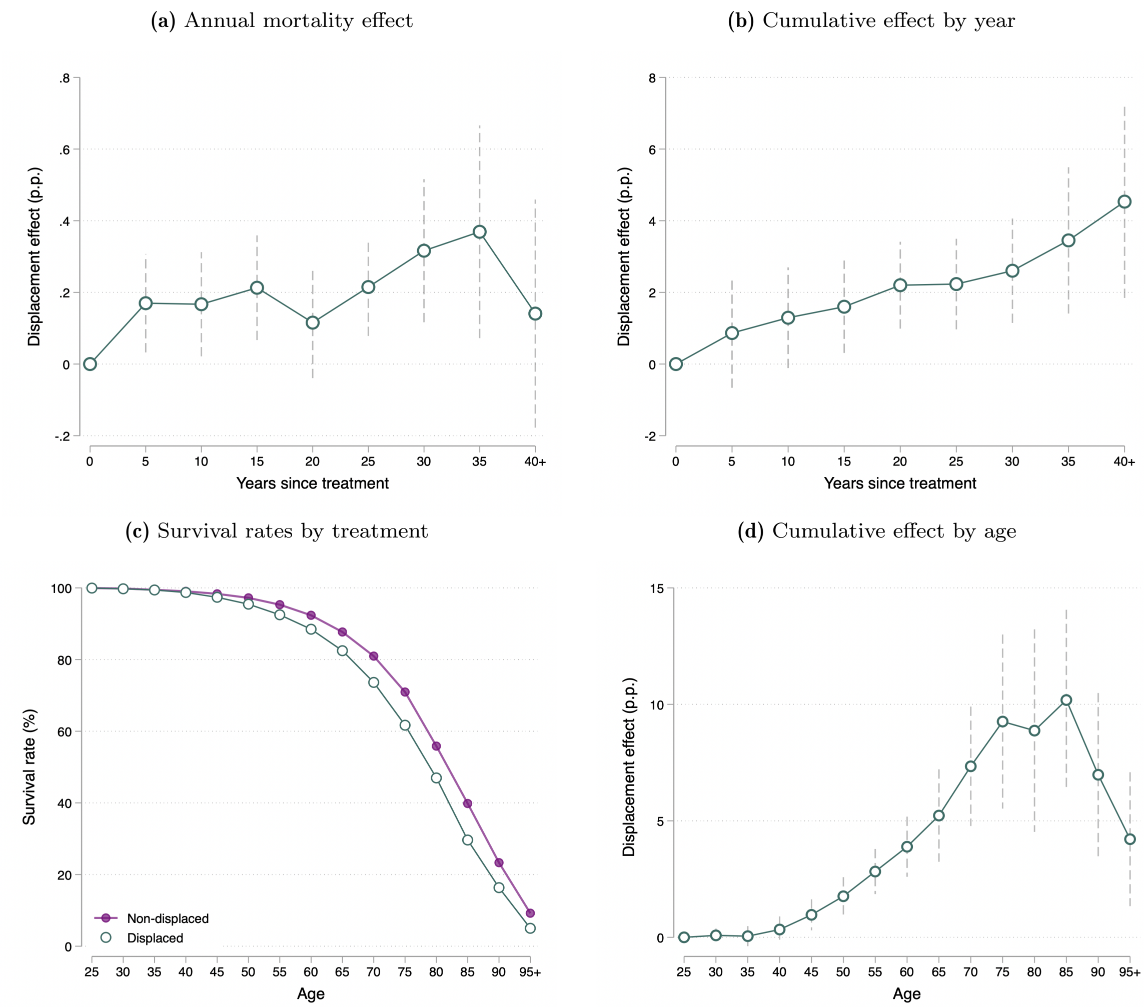
(a) Slum location before 1979 **(b)** Public housing projects after 1985



(c) Slum location before 1979 **(d)** Public housing projects after 1985

Notes: Orange lines represent municipality borders in 1980 in panels (a) and (b), and urban limits of Greater Santiago in panels (c) and (d). Municipalities are colored in gray scale to depict the concentration of jobs across the city. These figures show the change in the location of families living in slums in 1979 (panels (a) and (c)) and their final destination in 1985 (panels (b) and (d)). Purple squares represent families living in slums that were moved out from their original location and relocated into a new neighborhood; blue triangles represent the families in slums that were not evicted but received a housing unit in their original location. The figures also show how the dispersion of the location of these families decreases and how they are relocated to the periphery of the city after the policy. For context, consider that the richest municipalities of Santiago at that time (and today) are the ones located in the northeast of this map, and the poorer municipalities are located in the south and northwest of the city, which is exactly where the new public housing projects were built. The data to construct this map come from MINVU (1979), Molina (1986), Morales and Rojas (1986), and the population censuses of 1982 and 1992.

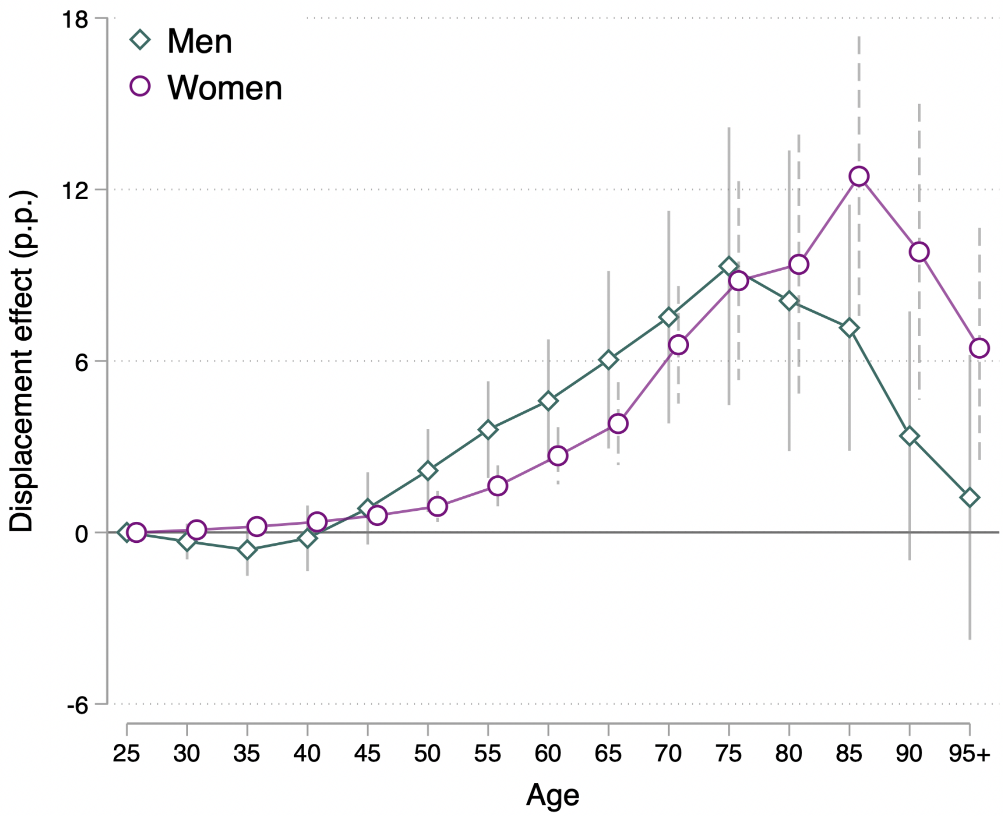
Figure 2: Displacement effect on annual and cumulative mortality



(a) Annual mortality effect
(b) Cumulative effect by year
(c) Survival rates by treatment
(d) Cumulative effect by age

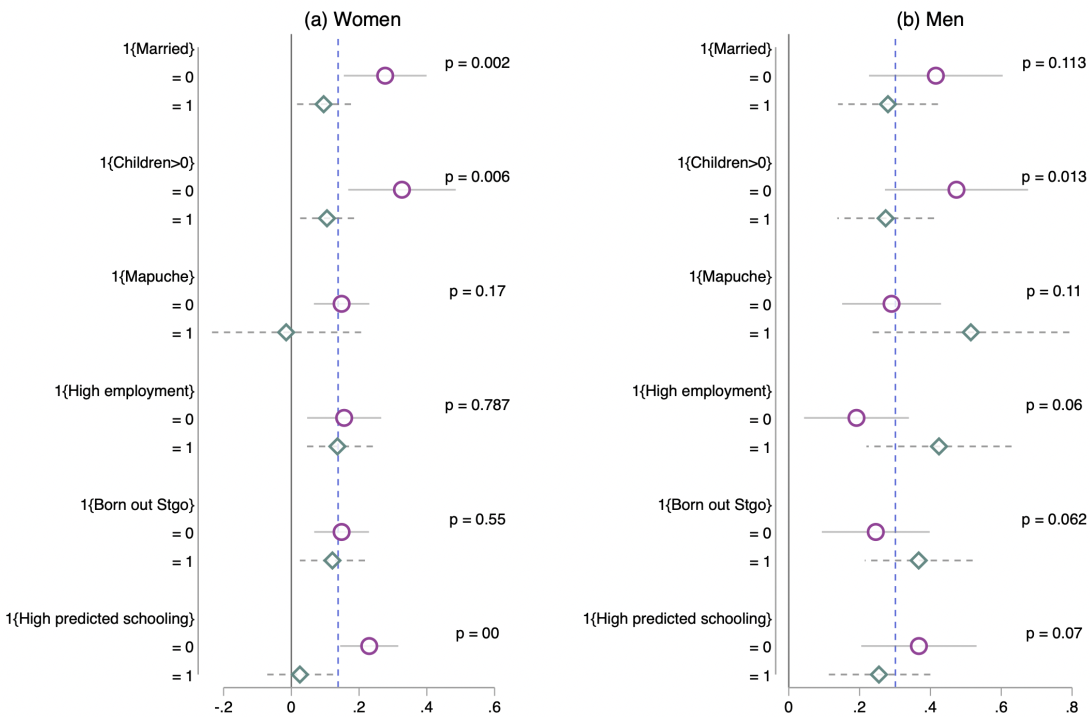
Notes: Estimates in percentage points. The figure in panel (a) plots the coefficients β_τ and their 95% confidence intervals from regression $Died_{it} = \sum_{\tau=0}^{40} \beta_\tau 1(t=\tau) \cdot Displaced_{s\{i\}} + X_i'\theta + \psi_o + \hat{p}(X_s) + \psi_o \times \hat{p}(X_s) + \gamma_t + \varepsilon_{it}$. Panel (b) plots equivalent estimates on cumulative mortality. Panel (c) plots empirical survival rates by treatment groups, and panel (d) depicts displacement effects by age on cumulative survival rate.

Figure 3: Displacement effect on adults' cumulative mortality by age and gender



Notes: Estimates in percentage points. The figure depicts displacement effects by age on cumulative survival rate, estimated separately for women in purple and for men in green.

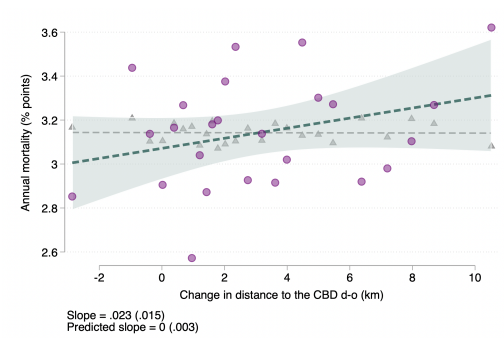
Figure 4: Displacement effects by demographic groups at baseline



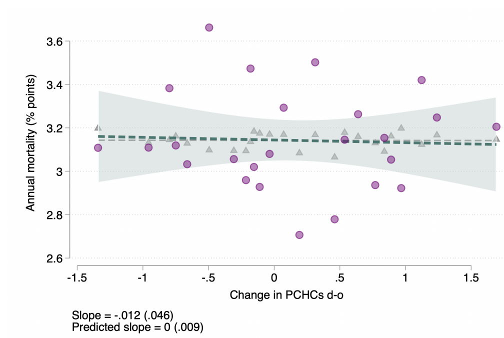
Notes: The figure plots displacement effects their 95% confidence intervals on annual mortality equivalent to equation (2) stratified by baseline demographics. Panel (a) is for the sample of women, and panel (b) for the sample of men. P-values are for the hypothesis of equality of coefficients. Blue dashed lines represent displacement effects as shown in Panels B and C of Table 4.

Figure 5: Relationship between movers' mortality after age 65 and change in location attributes

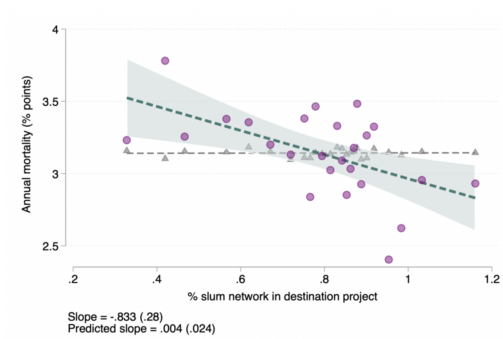
(a) Change in distance to CBD



(b) Change in PCHCs



(c) Change in slum network



Notes: These figures plot the correlation between movers' annual mortality after age 65 (y-axis) and the change in location attributes between destination and origin (x-axis). Both variables are residualized by baseline demographics, municipality-of-origin fixed effects, and the estimated propensity score, with the sample mean added back for interpretability. The change in each location attribute is divided into 25 equal-sized bins, and the data are collapsed to bin means. Gray triangles represent predicted annual mortality for displaced adults, computed using the demographics of non-displaced individuals at baseline.

Table 1: Slum characteristics before intervention

	Panel A. Full sample of slums				*Panel B. Slums in the Archives*			
	Displaced mean	Non-displaced mean	Difference	Conditional difference	Displaced mean	Non-displaced mean	Difference	Conditional difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Slum attributes								
# Families	231.584	228.579	3.005	15.354	298.487	322.522	-24.034	-7.928
			(36.710)	(42.026)			(72.631)	(75.605)
Families/hectare	71.906	60.923	10.983	1.224	63.160	66.844	-3.685	-6.566
			(7.756)	(6.844)			(10.711)	(9.920)
Military name	0.141	0.189	-0.048	-0.035	0.193	0.220	-0.027	-0.017
			(0.049)	(0.049)			(0.084)	(0.085)
Elevation (mas)	572.667	585.652	-12.985	-4.117	569.684	583.220	-13.535	-15.790
			(11.448)	(10.994)			(16.565)	(15.417)
Slope (degrees)	2.819	2.656	0.163	-0.013	2.772	2.610	0.161	0.095
			(0.232)	(0.233)			(0.304)	(0.312)
Close to a river/canal (<100m)	0.051	0.030	0.020	-0.001	0.035	0.024	0.011	-0.005
			(0.027)	(0.022)			(0.035)	(0.032)
Flooding risk	0.061	0.008	0.053**	0.008	0.035	0.000	0.035	0.000
			(0.025)	(0.013)			(0.025)	(0.000)
Distance to CBD	9.459	10.288	-0.829	-0.041	9.147	9.934	-0.787	-0.549
			(0.548)	(0.546)			(0.741)	(0.717)
Panel B. Attributes of the census district where a slum is located								
Population educational attainment	7.826	7.161	0.665***	-0.109	7.807	7.488	0.320	-0.205
			(0.250)	(0.160)			(0.379)	(0.253)
Unemployment rate	0.191	0.200	-0.009	0.011*	0.194	0.185	0.010	0.022**
			(0.008)	(0.006)			(0.012)	(0.009)
Number of schools	4.086	4.273	-0.187	-0.297	3.886	3.610	0.277	0.235
			(0.425)	(0.450)			(0.586)	(0.606)
Log property prices	14.800	14.738	0.062	0.003	14.822	14.773	0.049	-0.003
			(0.044)	(0.044)			(0.073)	(0.068)
Number of slums	99	132	231	224	57	41	98	95
Number of municipalities	15	15	15	15	14	14	14	14

Notes: Columns (1) and (2) show summary statistics for displaced (relocated) and non-displaced (redeveloped) slums in Morales and Rojas (1986)'s sample with non-missing attributes or locations. Slum locations and characteristics are constructed from Benavides et al. (1982), Morales and Rojas (1986), Ministerio de Vivienda y Urbanismo (MINVU), newspapers, and the Population Census of 1982. The number of families is presented for reference, but it is not accurate, as Morales and Rojas (1986) count subdivisions of larger slums as separate slums but measure density within the subdivision. Elevation, slope, and flooding risk data are obtained from Geoportal. Prices, unemployment, number of schools, and population education attainment are measured at the census district level where a slum was located. Column (3) reports the simple difference in each attribute between displaced and non-displaced slums, and column (4) reports the difference between groups conditional on the propensity score $\hat{p}(X_s)$ for slums in the sample with common support. Columns (5)-(8) repeat the exercise of the first four columns but for the sample of 98 slums found in the archival data. Robust standard errors are reported in parentheses. 10%*, 5%**, 1%***.

Table 2: Comparing displaced and non-displaced adults at baseline (year of intervention)

	All adults			Women			Men		
	Displaced mean	Non-displaced mean	Difference	Displaced mean	Non-displaced mean	Difference	Displaced mean	Non-displaced mean	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. Demographics									
Female	0.542	0.542	-0.001						
			(0.003)						
Age	34.928	34.936	0.557	34.582	34.641	0.562	35.336	35.285	0.550
			(0.569)			(0.574)			(0.578)
Female HH	0.359	0.339	0.008	0.428	0.395	0.005	0.277	0.273	-0.023
			(0.028)			(0.029)			(0.027)
Married or cohabit	0.754	0.794	-0.026**	0.710	0.757	-0.032***	0.805	0.838	-0.020**
			(0.010)			(0.012)			(0.010)
Married w/cert	0.830	0.852	-0.009	0.822	0.851	-0.017**	0.839	0.854	0.000
			(0.008)			(0.008)			(0.009)
Mapuche lastname	0.058	0.046	0.010**	0.058	0.041	0.012**	0.058	0.051	0.008
			(0.004)			(0.005)			(0.005)
Born out Stgo	0.460	0.481	-0.010	0.465	0.497	-0.023	0.453	0.463	0.006
			(0.019)			(0.021)			(0.019)
# children	2.241	2.193	0.09	2.232	2.177	0.083	2.253	2.212	0.099
			(0.058)			(0.053)			(0.068)
No children	0.158	0.164	-0.005	0.166	0.172	0.001	0.150	0.155	-0.013
			(0.011)			(0.010)			(0.012)
Years of educ[a]	6.409	6.728	-0.375**	6.101	6.410	-0.318**	6.846	7.169	-0.443**
			(0.167)			(0.152)			(0.193)
Predicted schooling from census	7.001	7.021	-0.034**	6.966	6.988	-0.034**	7.043	7.060	-0.035**
			(0.015)			(0.014)			(0.016)
Formal employment (1975-1980)									
by slum [b]	0.372	0.415	-0.009	0.372	0.414	-0.009	0.372	0.416	-0.010
			(0.019)			(0.019)			(0.018)
Child mortality (last 5 years)[c]									
# Children died < 1y	0.017	0.020	-0.001	0.016	0.018	-0.001	0.018	0.021	-0.002
			(0.003)			(0.003)			(0.004)
# Children died < 5y	0.021	0.024	0.000	0.020	0.023	0.000	0.022	0.026	0.000
			(0.003)			(0.003)			(0.004)
P-value for joint test of treatment significance			0.314			0.287			0.422
Panel B. Mortality after treatment									
Died	0.402	0.400	0.003	0.338	0.346	-0.006	0.477	0.465	0.014
			(0.022)			(0.020)			(0.027)
Age at death	68.298	71.865	-2.636***	70.268	73.811	-2.826***	66.651	70.153	-2.394***
			(0.428)			(0.472)			(0.516)
Panel C. Matching rates to administrative data									
In RSH	0.821	0.827	0.001	0.863	0.869	-0.005	0.771	0.777	0.007
			(0.013)			(0.011)			(0.017)
In Pensions	0.714	0.775	-0.045**	0.764	0.817	-0.042***	0.654	0.726	-0.049**
			(0.018)			(0.015)			(0.023)
In Pensions | Alive & ≥ 65	0.985	0.981	0.005**	0.989	0.982	0.007***	0.981	0.979	0.003
			(0.002)			(0.002)			(0.004)
Adults	19,676	9,566	29,242	10,643	5,181	15,824	9,033	4,385	13,418
Slums	54	41	95	54	41	95	54	41	95
Municipalities		14			14			14	

Table contains information for individuals in common support with non-missing NIDs. Column (1) reports means for displaced adults at baseline, and column (2) for non-displaced adults. Column (3) reports the difference between groups, adjusted for the estimated probability of slum clearance within municipalities ($\hat{p}(X_s) + \psi_o + \hat{p}(X_s) \times \psi_o$). Columns (4)–(6) repeat the exercise for women, and columns (7)–(9) repeat the exercise for men. Standard errors are clustered by slum of origin in parentheses. 10%*, 5%**, 1%***. [a]Years of schooling is observed in the sample of individuals found in the RSH, conditional on an individual being alive after 2007. [b]Formal employment is measured at the slum level using historical data from the Superintendence of Pensions. [c]Child mortality measures whether the individual had a child born alive but died before the age of 1 or the age of 5, in the five years before treatment.

Table 3: Displacement effect on location outcomes

Outcome	Displacement effect (1)	Non-displaced mean (2)	Percent effect (%) (3)	Observations (4)	P-value (5)
Panel A: Location outcomes after relocation (1982-1985)					
Distance to CBD (km)	2.256***	11.486	19.7	29,242	0.006
	(0.820)				
Longevity	-2.309***	65.838	-3.6	29,242	0.001
	(0.723)				
Schooling	-0.966**	6.884	-14.1	29,242	0.010
	(0.369)				
Unemployment	0.052***	0.218	23.8	29,242	0.001
	(0.016)				
Primary care centers	-0.121	0.642	-18.9	29,242	0.580
	(0.218)				
Hospitals	-0.408*	0.577	70.8	29,242	0.092
	(0.240)				
Neighb. property prices	-0.126*	14.898	-0.9	29,242	0.090
	(0.059)				
Home value	5.096	312.937	1.6	29,242	0.659
	(11.543)				
Panel B: Long-term location outcomes (2016-2023)					
Longevity	0.756	71.073	1.0	22,070	0.174
	(0.553)				
% poor in current neigh.	0.021*	0.540	3.7	21,317	0.053
	(0.011)				
Municipality of assignment	0.005	0.591	0.6	22,070	0.953
	(0.007)				
Municipality of origin	-0.298***	0.625	–47.9	22,070	0.000
	(0.052)				

Notes: This table shows estimates for the displacement effect using equation 1 in column (1). Column (2) reports the mean for the non-displaced group, and column (3) the percent displacement effect. Column (4) reports sample observations, and column (5) the p-value. All regressions include baseline controls: female, woman is head of household, married, cohort fixed effects, number of children per household, Mapuche last name dummy, and formal employment at the slum level.

Table 4: Displacement effect on mortality outcomes

	Annual Mortality (percentage points)			Expected Lifespan (years)		
	All	Survival to 65	Survival to 75	All	Survival to 65	Survivval to 75
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All adults						
Displaced	0.228***	0.530***	0.790**	-2.438***	-1.426***	-0.950**
	(0.047)	(0.158)	(0.337)	(0.528)	(0.374)	(0.352)
Non-displaced mean	0.973	2.621	4.846	75.818	86.995	87.911
% effect	23.4	20.2	16.3	-3.2	-1.6	-1.1
Individuals	29,242	23,488	10,433	29,242	23,488	10,434
Panel B: Women						
Displaced	0.154***	0.362***	0.759**	-2.385***	-1.495***	-1.088**
	(0.044)	(0.137)	(0.336)	(0.534)	(0.437)	(0.424)
Non-displaced mean	0.813	2.268	4.329	81.531	88.006	90.731
% effect	18.9	16.0	17.5	-2.9	-1.7	-1.2
Individuals	15,824	13,034	5,963	15,834	13,043	5,964
Panel C: Men						
Displaced	0.342***	0.814***	1.066*	-2.696***	-1.461***	-1.048**
	(0.073)	(0.263)	(0.630)	(0.686)	(0.507)	(0.498)
Non-displaced mean	1.173	3.084	5.636	74.413	88.647	86.928
% effect	29.2	26.4	18.9	-3.6	-1.6	-1.2
Individuals	13,418	10,454	4,470	13,418	10,454	4,470
P-val $H_0 : \beta_{females} = \beta_{males}$	0.008	0.058	0.624	0.623	0.952	0.945

Notes: This table reports displacement effects on annual mortality estimated using equation (2). Column (1) uses the full sample; columns (2) and (3) condition on survival to age 65 and age 75, respectively. Coefficients multiplied by 100 to represent percentage points. Columns (4)–(6) estimate the displacement effect on expected lifespan as the area under the displacement effect on the survival curve by age, as shown in panel (d) of Figure 2. Panels B and C report estimates separately for women and men; the row labeled *p-value* reports the p-value for the test of equality of displacement coefficients across genders. All regressions include calendar-year and year-of-treatment fixed effects. Baseline controls include the following: female, woman is head of household, married, cohort fixed effects, number of children per household, Mapuche last name dummy, and formal employment at the slum level. Standard errors are clustered at the slum level. 10%*, 5%**, 1%***.

Table 5: Displacement effect on other long-term outcomes

Outcome	Displacement effect (1)	Non-displaced mean (2)	Percent effect (%) (3)	Observations (4)	P-value (5)
Panel A: Pensions in $CLP 1,000 per month (2014-2023)					
Self-funded pension	-9.521***	42.351	-22.5	20,656	0.000
	(2.740)				
Subsidized pension	0.801	17.647	4.5	20,656	0.364
	(0.904)				
Complementary pension	4.756***	27.499	17.2	20,656	0.000
	(0.904)				
1[Disability pension]	0.027***	0.041	63.4	11,384	0.000
	(0.006)				
Disability pension	0.864	0.647	133.3	11,384	0.417
	(0.584)				
Panel B: Labor market outcomes after age 65					
Employed	0.027***	0.274	9.8	22,039	0.007
	(0.010)				
Monthly labor income (CLP/1,000)	1.441	57.265	2.5	22,039	0.680
	(3.494)				
Employed with contract	0.018**	0.087	19.5	22,039	0.030
	(0.008)				
Formal Labor income (CLP/1,000)	1.999	25.626	7.8	22,039	0.450
	(2.636)				
Welfare (CLP/1,000)	4.230***	41.642	10.1	25,365	0.000
	(1.151)				
Panel C: Family arrangements by 2023					
# children ever born	0.135***	2.591	5.2	29,242	0.004
	(0.046)				
# children post treatment	0.056***	0.456	12.0	29,242	0.004
	(0.019)				
Spouse died	0.046***	0.394	11.6	26,142	0.000
	(0.013)				
Re-married	0.011	0.097	11.3	26,142	0.172
	(0.008)				
Family size	0.027**	3.337	0.7	24,061	0.015
	(0.010)				
% elderly (>65) in household	-0.002*	0.296	-1.1	24,061	0.059
	(0.001)				
% children (<18) in household	0.002**	0.185	0.5	24,061	0.013
	(0.001)				

Notes: This table shows estimates for the displacement effect using equation 1 in column (1). Column (2) reports the mean for the non-displaced group, and column (3) the percent displacement effect. Column (4) reports sample observations, and column (5) the p-value. All regressions control for baseline controls including: female, woman is head of household, married, cohort fixed effects, number of children per household, Mapuche last name dummy, and formal employment at the slum level.

Table 6: Changes in location attributes and annual mortality

	Annual mortality after age 65 (percentage points)				
	(1)	(2)	(3)	(4)	(5)
Displaced	0.530***	0.371**	0.227	0.104	0.037
	(0.158)	(0.177)	(0.171)	(0.178)	(0.182)
Δ Distance to CBD		0.048**		0.026	0.046***
		(0.019)		(0.019)	(0.014)
Δ PCHCs		-0.010		-0.012	-0.049
		(0.065)		(0.060)	(0.049)
Δ Hospitals		-0.091**		-0.109**	-0.128***
		(0.043)		(0.044)	(0.039)
Δ Death rate		0.019		0.009	0.019
		(0.017)		(0.017)	(0.015)
Slum network (0-1)			-0.899***	-0.837***	-0.704***
			(0.277)	(0.285)	(0.245)
Distance from origin			0.023**	0.025**	0.024**
			(0.009)	(0.010)	(0.010)
Home value (UF)					0.002
					(0.001)
Non-displaced mean	2.621	2.621	2.621	2.621	2.621
Observations	252,173	252,173	252,173	252,173	252,173
Individuals	23,488	23,488	23,488	23,488	23,488

Notes: Outcome is annual mortality in t conditional on surviving in $t-1$ after age 65. Coefficients multiplied by 100 to represent percentage points. All regressions include calendar-year and year-of-treatment fixed effects. Baseline controls include the following: female, woman is head of household, married, cohort fixed effects, number of children per household, Mapuche last name dummy, and formal employment at the slum level. Standard errors clustered by slum of origin are in parentheses. 10%*, 5%**, 1%***.

Table 7: Displacement effect on annual mortality by cause of death

	Annual Mortality by Cause of Death				
	Cardiovascular	Cancer	Internal	External	Other
	(1)	(2)	(3)	(4)	(5)
Panel A: Full sample					
Displaced	0.074***	0.048***	0.070***	0.033***	0.003
	(0.020)	(0.016)	(0.016)	(0.010)	(0.004)
Non-displaced mean	0.311	0.236	0.331	0.065	0.011
% effect	23.7	20.2	21.1	50.8	28.6
Individuals	29,242	29,242	29,242	29,242	29,242
Panel B: Women					
Displaced	0.061**	0.047**	0.055***	0.012	-0.005
	(0.025)	(0.019)	(0.018)	(0.008)	(0.004)
Non-displaced mean	0.259	0.208	0.264	0.236	0.008
% effect	23.4	22.7	21.0	50.1	-56.9
Individuals	15,824	15,824	15,824	15,824	15,824
Panel C: Men					
Displaced	0.092***	0.048*	0.094***	0.064***	0.015**
	(0.029)	(0.026)	(0.029)	(0.022)	(0.007)
Non-displaced mean	0.377	0.271	0.415	0.118	0.015
% effect	24.3	17.7	22.5	54.0	99.4
Individuals	13,418	13,418	13,418	13,418	13,418
P-val $H_0 : \beta_{females} = \beta_{males}$	0.398	0.981	0.280	0.037	0.016

Notes: This table reports displacement effects on annual mortality estimated using equation (2), separately by cause of death. All regressions include calendar-year and year-of-treatment fixed effects. Baseline controls include the following: female, woman is head of household, married, cohort fixed effects, number of children per household, Mapuche last name dummy, and formal employment at the slum level. Standard errors are clustered at the slum level. 10%*, 5%**, 1%***.

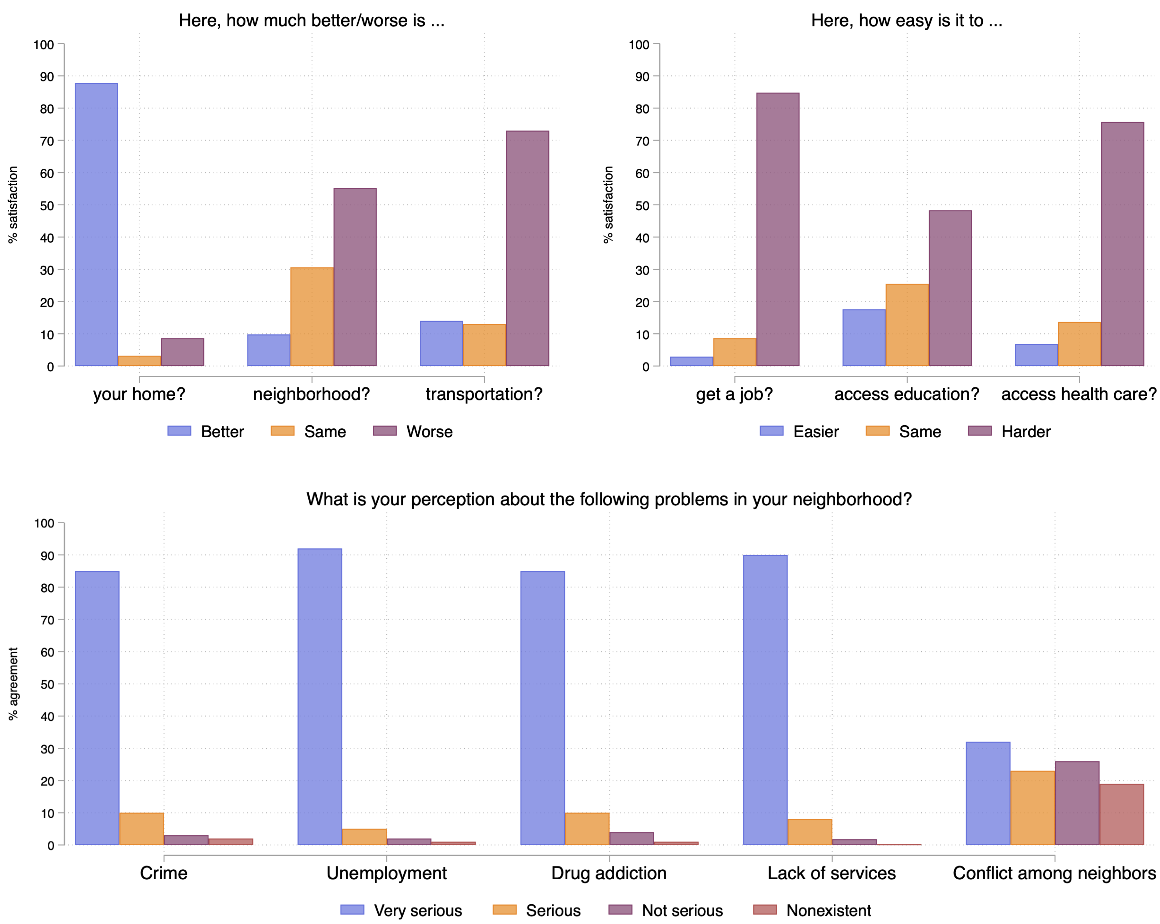
Appendix and Supplementary Material

A Additional Figures and Tables

Figure A.1: Example of a slum and new neighborhoods

Notes: Examples of neighborhoods from Hidalgo (2019).

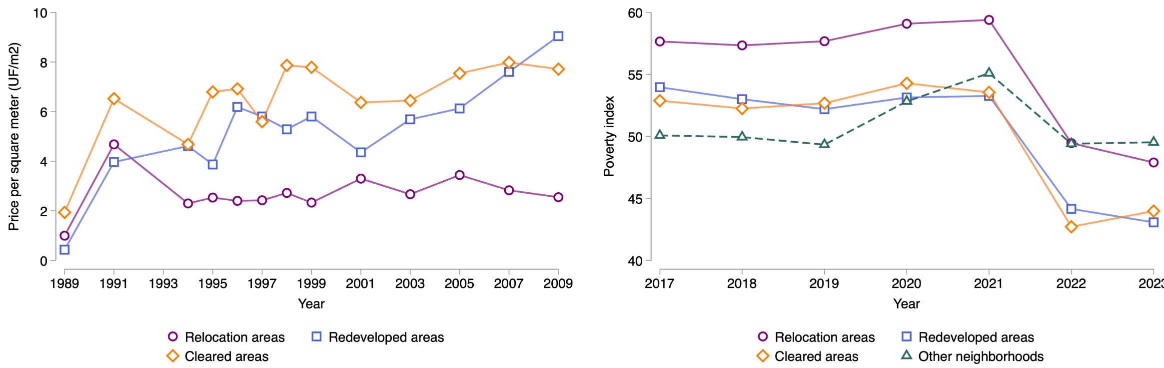
Figure A.2: Summary of evaluation of the Program for Urban Marginality (Aldunate et al., 1987)



Notes: Summary of results found by Aldunate et al. (1987). The authors interviewed 592 displaced slum dwellers that were relocated into new neighborhoods.

Figure A.3: Property values and poverty rates in treated neighborhoods across time

(a) Property values **(b)** Poverty rates



Notes: Panel (a) plots the average property value per square meter, measured in UF/m^2, in areas were slums and neighborhoods were located. We use historical data from Trivelli (1989-2009) by zone, which is similar to a census district in 1982 (Trivelli, 2009). To compute the averages, we control for the number of offers per zone. Panel (b) plots the poverty index per neighborhood using the RSH data. The poverty index is defined as the proportion of individuals per neighborhood who qualify for social assistance. Each treatment is defined as follows: 1) relocation areas are neighborhoods that housed displaced families; 2) redeveloped areas are neighborhoods where slums were redeveloped on-site; 3) cleared areas are neighborhoods from which displaced families were evicted; and 4) other neighborhoods include all other areas in Greater Santiago not classified into the previous categories.

Figure A.4: Kaplan-Meier survival functions by year after treatment

(a) Women **(b)** Men

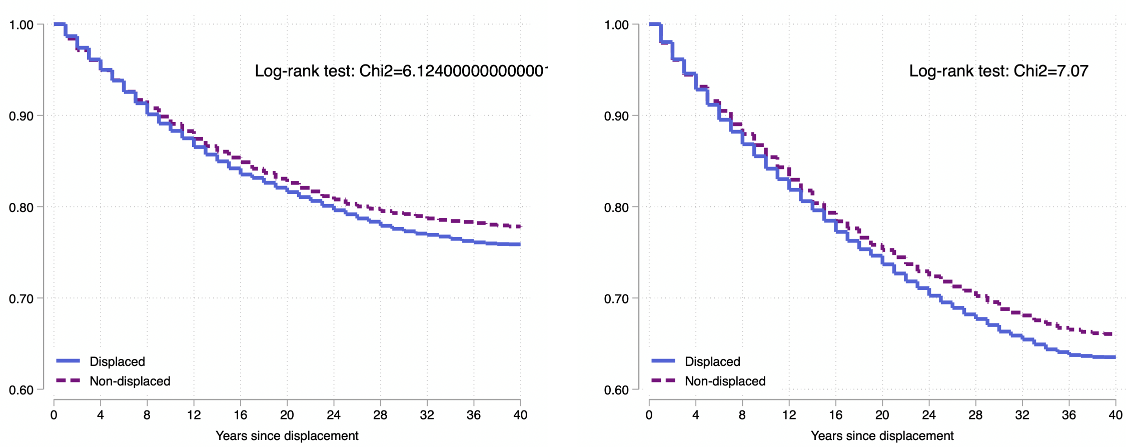


Figure A.5: Kaplan-Meier survival functions by age at death

(a) Women **(b)** Men

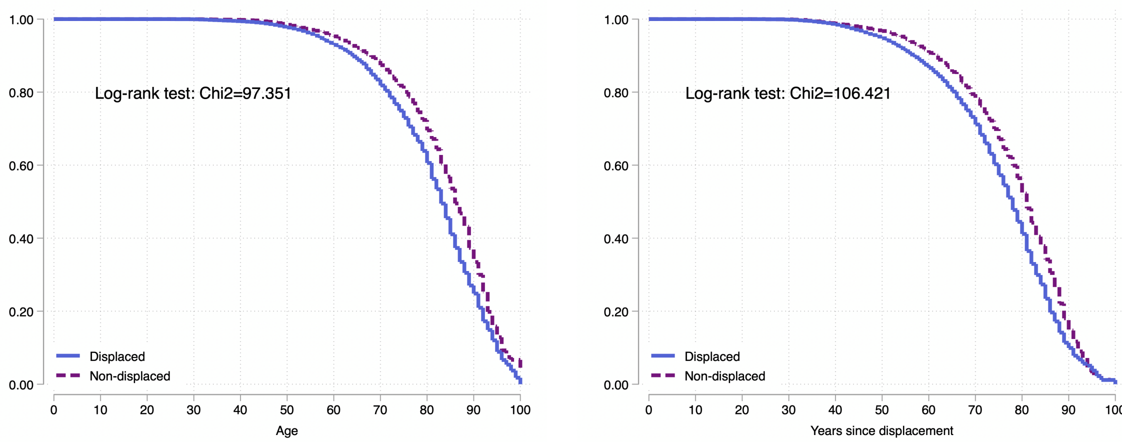
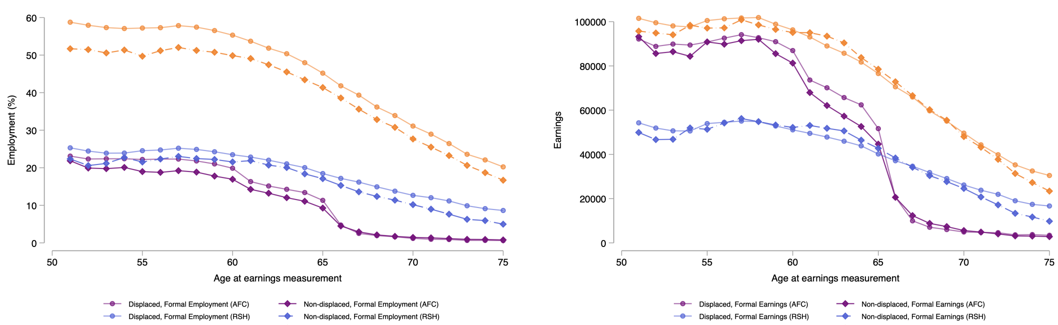


Figure A.6: Labor market outcomes trajectories by age at measurement

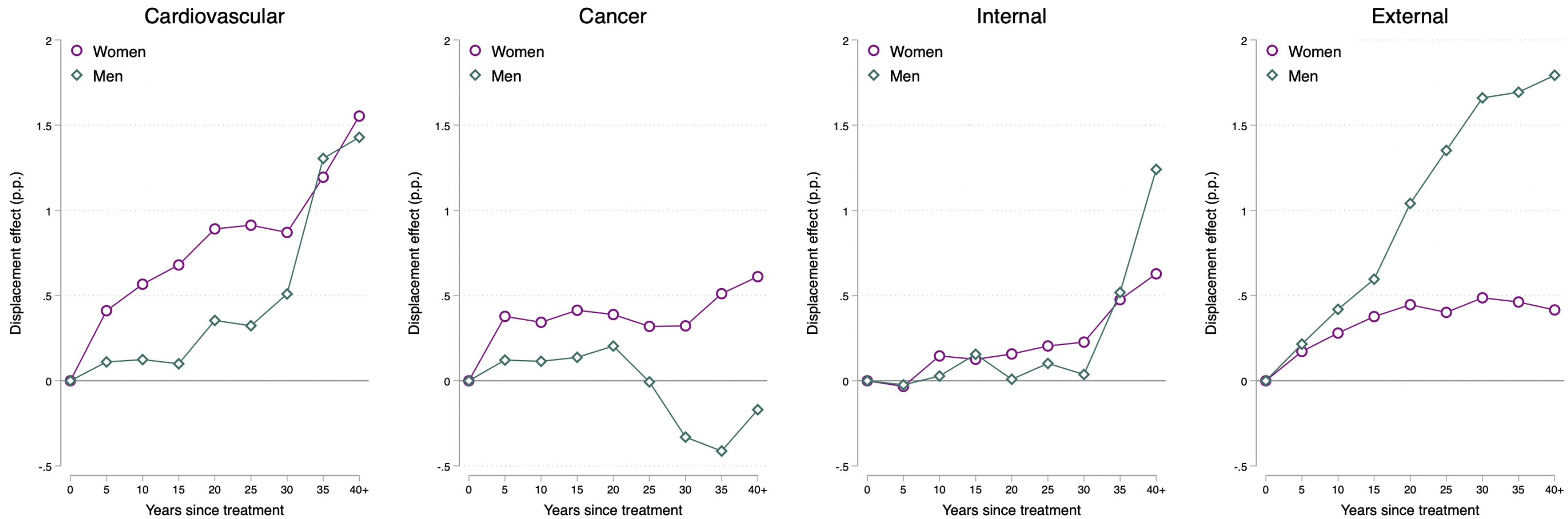
(a) Employment **(b)** Earnings



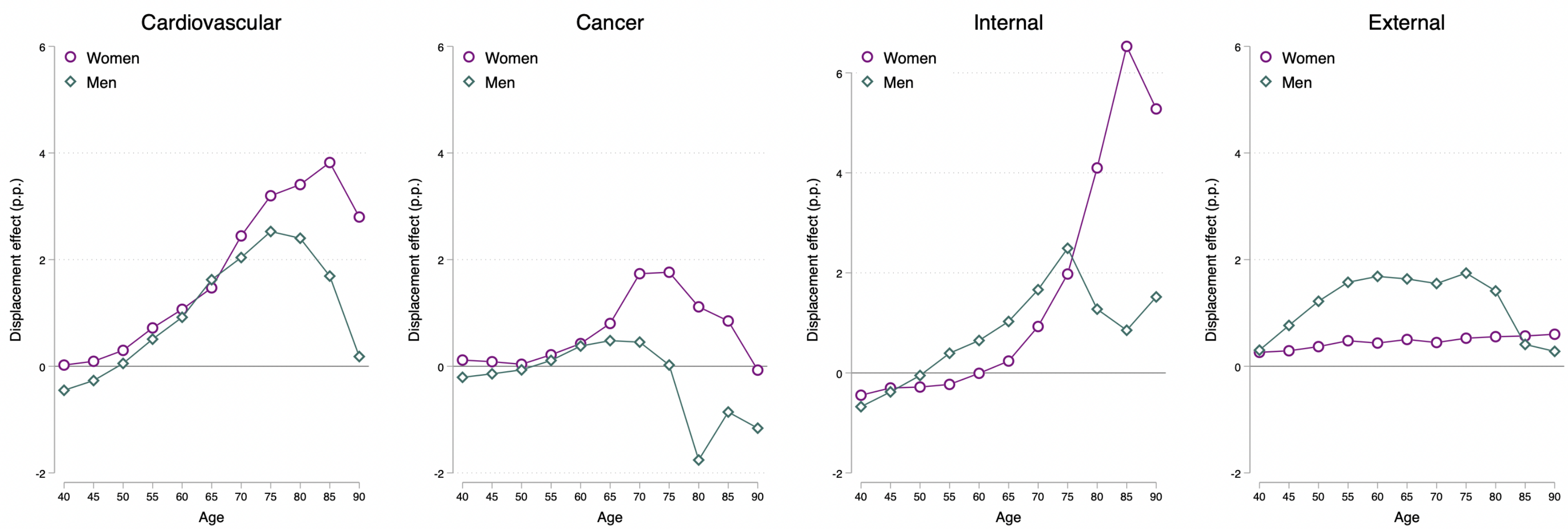
Notes: Sample includes individuals that are matched to the RSH and AFC data between 2007 and 2023. Panels plot the predicted trajectories for displaced and non-displaced individuals between ages 50 and 84 from the regression $y_{it} = \sum_{\tau=50}^{84} \beta_\tau Displaced * 1[Age = \tau] + \sum_{\tau=50}^{84} \delta_\tau 1[Age] + \psi_o + \hat{p}(X_s) + \hat{p}(X_s) \times \psi_o + X_{it}'\gamma + u_{it}$. Baseline controls include the following: woman is head of household, married, age fixed effects, number of children, Mapuche last name, formal employment, and year-of-intervention fixed effects.

Figure A.7: Displacement effect on cumulative mortality by cause of death

(a) Effects by years since treatment



(b) Effects by age



Notes: The figure plots the cumulative displacement estimates equivalent to panels (b) and (d) in Figure 2 separately by sex and cause of death. The confidence intervals have been omitted for presentation purposes.

Table A.1: Displacement effect on annual mortality of adults (percentage points)

	Annual Mortality (percentage points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Displaced	0.315***	0.253***	0.215***	0.215***	0.169***	0.228***
	(0.047)	(0.052)	(0.044)	(0.044)	(0.044)	(0.047)
Non-displaced mean	0.973	0.973	0.973	0.973	0.973	0.973
% effect	32.4	26.0	22.1	22.1	17.4	23.4
Observations	1,095,816	1,095,816	1,095,816	1,095,816	1,095,816	1,095,816
Individuals	29,242	29,242	29,242	29,242	29,242	29,242
Year FE	✓	✓	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓	✓	✓
Year of treatment FE		✓	✓	✓	✓	✓
Origin FE			✓	✓	✓	✓
$\hat{p}(X_s)$				✓	✓	✓
$\psi_o \times \hat{p}(X_s)$					✓	✓
Baseline controls						✓

Notes: Outcome is annual mortality in t conditional on surviving in $t-1$. Coefficients multiplied by 100 to represent percentage points. All regressions include calendar-year and year of treatment fixed effects. Standard errors are clustered by slum of origin in parentheses (95 clusters). Baseline controls include the following: female, woman is head of household, married, cohort fixed effects, number of children per household, Mapuche last name dummy, formal employment at the slum level. Slum characteristics include families per hectare, military name, closeness to rivers/canals, slope, risk of flooding, average schooling and unemployment by census district, number of schools per census district, and distance to the CBD. The row labeled as "Percent effect" stands for percentage variation with respect to the n-displaced mean. The non-displaced mean in columns (4) and (5) is computed conditional on propensity score $\hat{p}(X_s)$. 10%*, 5%**, 1%***.

Table A.2: Displacement effect on the probability of selling home by 2019

			Conditional on selling		
	Home ever sold	Inheritance	Log(Price)	Year sold	# years after treatment
	(1)	(2)	(3)	(4)	(5)
Displaced	-0.007	0.009	-0.077	-1.735	-0.520
	(0.010)	(0.011)	(0.204)	(2.081)	(2.027)
Adj. R^2	0.028	0.045	-0.019	0.031	0.043
Non-displaced mean	0.047	0.143	9.607	2009.077	26.820
Percent effect	**-14.9**	**6.3**	**-0.8**	**-0.09**	**-1.9**
Observations	3,995	3,995	224	224	224

Notes: Due to my small sample, I compute inverse propensity score estimates in the archival sample of families who received a home in a municipality located in the northern and central areas of Greater Santiago. The data include 45 slums of origin, 9 municipalities of origin, and 15 municipalities of destination. Baseline controls include the following: female-headed household, number of children in family, married head of household, head of household's age, Mapuche head of household, average slums' formal employment, head of household's year-of-birth fixed effects, and year-of-intervention fixed effects. Clustered standard errors by slum of origin are in parentheses. 10%*, 5%**, 1%***.

Table A.3: Main causes of death Chilean population (DEIS)

Cause of death	2001		2018	
	Males (%)	Females (%)	Males (%)	Females (%)
Cancer	22.46	25.32	25.90	25.70
Lung cancer	3.24	1.89	3.73	2.78
Stomach cancer	4.56	2.78	3.91	2.05
Breast cancer	0.01	2.89	0.01	3.14
Colorectal cancer	1.00	1.46	2.07	2.29
Pancreatic cancer	0.77	1.11	1.30	1.61
Prostatic cancer	3.10	0.00	4.00	0.00
Gynecologic cancer	0.0	3.65	0.00	3.10
Bile duct cancer	1.26	3.84	1.26	2.66
Cardiovascular disease	15.03	15.91	14.18	13.07
Diabetes	3.27	4.50	2.94	3.30
High blood pressure	2.77	4.64	4.73	7.45
External cause	8.81	2.12	6.92	2.45
Alcohol related	4.50	0.78	2.25	0.41
Tobacco related	4.09	2.80	5.20	4.34

Table A.4: Causes in Death Certificates (DC) and Admin. Data (DEIS)

Cause of death	Women		Men	
	DEIS (%)	DC (%)	DEIS (%)	DC (%)
Cancer	31.40	25.70	28.05	24.40
Lung cancer	3.52	4.37	5.57	6.50
Stomach cancer	3.66	2.98	5.18	4.31
Breast cancer	2.84	2.33	0.02	0.02
Colorectal cancer	2.30	1.10	1.71	0.94
Pancreatic cancer	1.67	1.63	1.26	1.27
Prostatic cancer	0.0	0.02	3.12	2.75
Gynecologic cancer	3.97	2.90	0.00	0.0
Bile duct cancer	4.43	3.82	1.47	1.13
Cardiovascular disease	15.12	15.74	15.64	16.62
Diabetes	5.84	0.82 (4.20)	4.90	0.53 (3.18)
High blood pressure	5.62	0.36 (11.69)	4.63	0.30 (9.73)
External cause	2.38	1.49	4.93	5.25
Alcohol related	2.87	1.51	5.69	4.84
Tobacco related	6.67	5.71	8.37	8.88
Undetermined	0.84	1.26	0.86	1.87
Not classified	-	0.3	-	0.4

Table A.5: Variations to the propensity score method

	Outcome: 1[Died after intervention]					
	Baseline	Inv. weight	$p_5 < p < p_{95}$	$p_{10} < p < p_{90}$	Restricted munic.	Restricted cells
	(1)	(2)	(3)	(4)	(5)	(6)
Displaced	0.228***	0.252***	0.297***	0.230***	0.283***	0.251***
	(0.047)	(0.042)	(0.052)	(0.044)	(0.053)	(0.052)
Adj. R^2	0.017	0.017	0.017	0.017	0.017	0.017
Non-displaced mean	0.973	0.973	0.977	0.982	0.995	0.995
% effect	23.4	25.9	30.4	23.5	28.5	25.2
Observations	1,095,816	1,095,816	1,021,851	790,193	938,083	743,120
Individuals	29,242	29,242	27,242	21,021	25,106	19,873
# slums	97	97	90	79	80	66

Notes: Regression in Column (1) equivalent to column (1) in Table 4. Column (2) estimates the regression using propensity score reweighting. Columns (3) and (4) restrict the common support to the 90 and 80% of the sample. Finally, column (5) drops from the sample 3 municipalities with low common support of the propensity score within municipality. The non-displaced mean is computed conditional on propensity score $\hat{p}(X_s)$. Standard errors are clustered by slum of origin in parentheses (94 clusters). 10%*, 5%**, 1%***.

Table A.6: Displacement effect estimated using original assignment as instrumental variable

	Annual Mortality (percentage points)			Expected Lifespan (years)		
	All	Survive 65	Survive 75	All	Survive 65	Survive 75
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Propensity score						
Displaced	0.180***	0.222	0.150	-2.335***	-0.947*	-0.826*
	(0.065)	(0.214)	(0.424)	(0.686)	(0.557)	(0.485)
Non-displaced mean	0.973	2.621	4.846	72.038	76.540	71.017
% effect	18.5	8.5	3.1	-3.2	-1.2	-1.2
Individuals	18,363	14,059	5,563	18,363	14,059	5,563
Panel B: Instrumental Variable						
Displaced	0.228***	0.274	0.167	-2.852***	-1.255*	-1.045*
	(0.084)	(0.264)	(0.583)	(0.991)	(0.714)	(0.574)
Non-displaced mean	0.973	2.621	4.846	64.776	84.848	90.280
% effect	23.5	10.4	3.4	-4.4	-1.5	-1.2
Individuals	18,363	14,059	5,563	18,363	14,059	5,563

Notes: Estimates in panel A are equivalent to Table 4 using data from 1980 to 1984. Panel B reports instrumental variable estimates using data from 1980 to 1984, where displacement is instrumented by MINVU's original assignment to treatment in the 1980 slum census. The relationship between displacement and original assignment is statistically significant with a coefficient of 0.68. Standard errors are clustered by slum of origin in parentheses (94 clusters). 10%*, 5%**, 1%***.

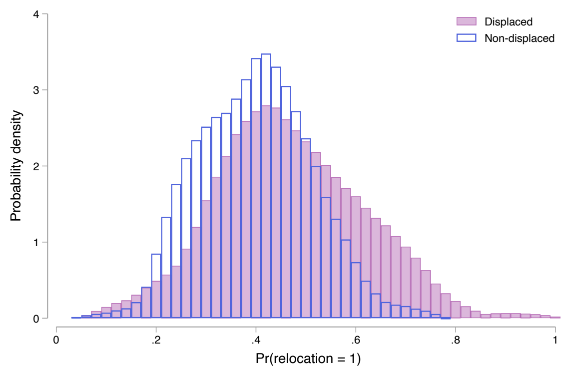
Table A.7: Assignment location attributes and displaced families' characteristics at baseline

Attributes at destination	Home value (UF) (1)	Distance from origin (2)	Adult pop. schooling (3)	# schools/ 1,000 students (4)	Log property prices (5)	Distance to CBD (6)	Primary care centers (7)	Unemployment rate (8)
Female HH	-1.544	0.030	-0.002	0.066	0.023	0.130	0.003	0.008
	(1.591)	(0.108)	(0.001)	(0.050)	(0.016)	(0.105)	(0.002)	(0.006)
# Children	0.180	-0.003	-0.000	-0.009	0.006	-0.018	-0.000	0.002
	(0.225)	(0.022)	(0.000)	(0.007)	(0.005)	(0.022)	(0.000)	(0.002)
Married HH	0.855*	-0.104*	0.001	0.010	-0.007	-0.107***	-0.001	-0.002
	(0.452)	(0.055)	(0.001)	(0.021)	(0.009)	(0.038)	(0.001)	(0.004)
HH age	0.128	-0.015**	0.000	-0.002	-0.002	-0.015*	-0.000	-0.001
	(0.120)	(0.007)	(0.000)	(0.005)	(0.001)	(0.008)	(0.000)	(0.001)
Mapuche HH	1.831	-0.131	0.000	-0.048	-0.022	-0.121	-0.003	-0.004
	(1.452)	(0.087)	(0.001)	(0.051)	(0.014)	(0.101)	(0.002)	(0.004)
HH schooling > 6	0.671	0.015	-0.000	-0.014	-0.012	-0.060	-0.000	-0.006
	(0.460)	(0.047)	(0.001)	(0.015)	(0.011)	(0.046)	(0.001)	(0.004)
HH schooling > 12	-1.466	0.213*	-0.002	0.090	-0.000	0.183	0.004	-0.002
	(1.972)	(0.110)	(0.001)	(0.067)	(0.006)	(0.128)	(0.003)	(0.003)
HH schooling unknown	0.292	-0.082*	0.000	-0.063*	0.008	-0.063	-0.002	0.004
	(1.019)	(0.068)	(0.001)	(0.033)	(0.009)	(0.076)	(0.002)	(0.003)
Adjusted R^2	0.750	0.923	0.718	0.499	0.699	0.750	0.784	0.619
Observations	8,435							
P-value of F-test of joint significance of education dummies								
Attribute in Δ	0.018	0.246	0.208	0.170	0.417	0.180	0.445	0.295
P-value of F-test of joint significance of households' characteristics								
Attribute in Δ	0.210	0.009	0.319	0.116	0.258	0.131	0.570	0.201
Municipality of origin FE	✓	✓	✓	✓	✓	✓	✓	✓
Year of intervention FE	✓	✓	✓	✓	✓	✓	✓	✓

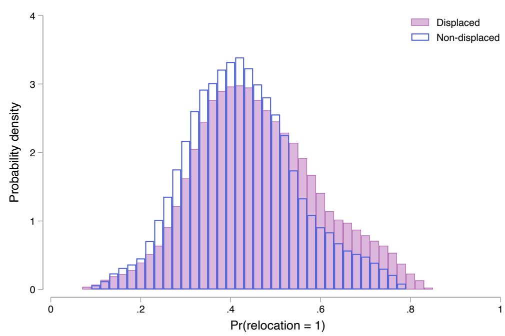
Notes: Standard errors clustered by slum of origin. 10%*, 5%**, 1%***. Attributes in columns (3) to (8)are measured at the census district level in 1982; schools, hospitals and subway are measured in 1985.

B Attrition

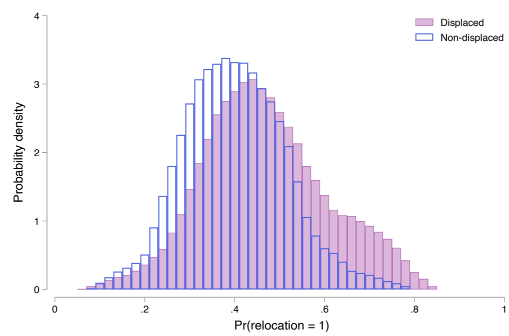
Figure B.1: Distribution of the probability of slum relocation versus redevelopment



(a) Full sample of urban slums



(b) Urban slums in Archives



(c) Urban slums in Archives (weighted)

Notes: Panel (a) plots the fitted values of a LASSO logit regression of the probability of slum relocation on slums' attributes in Table (1) for the full sample of slums by treatment. The LASSO estimation selects as determinants of relocation slum density, military name, elevation, and average population schooling. Panel (b) plots the propensity score estimates in the sample of slums found in the archives. Finally, panel (c) reweights the densities in panel (b) by the inverse probability of finding a slum in the archives. The probability of finding a slum in the archives is computed using a logit model on slums' characteristics and stratified by treatment.

Table B.1: Comparing displaced and non-displaced individuals in archival records

	All adults in Archives				Adults with NID			
	Displaced mean	Non-displaced mean	Difference	Difference weighted	Displaced mean	Non-displaced mean	Difference	Difference weighted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.527	0.516	0.010***	0.009***	0.531	0.529	0.003	0.003
			(0.003)	(0.003)			(0.002)	(0.002)
Female household head	0.370	0.355	0.012	0.006	0.360	0.343	0.014	0.007
			(0.022)	(0.024)			(0.023)	(0.025)
Mapuche lastname	0.056	0.044	0.016***	0.014***	0.057	0.045	0.016***	0.015***
			(0.004)	(0.003)			(0.004)	(0.003)
Two partners in sample	0.889	0.851	0.028*	0.025	0.906	0.932	-0.027***	-0.025***
			(0.017)	(0.017)			(0.005)	(0.005)
Missing NID	0.053	0.123	-0.061***	-0.056***	0.000	0.000	–	–
			(0.014)	(0.014)			(–)	(–)
Observations	23,180	11,325	34,505	34,505	21,941	9,928	31,869	31,869
Households	12,874	6,491	19,365	19,365	10,888	5,380	16,268	16,268
Slums	58	40	98	98	58	40	98	98
Municipalities	14	14	14	14	14	14	14	14

Notes: Sample includes all individual found in archival data in urban municipalities with variation in treatment. Column (1) reports means for displaced adults at baseline and column (2) for non-displaced adults. Column (3) reports the simple difference between groups, and column (4) reports the difference between treatment weighted by the inverse probability of finding a slum in the archival data. Columns (5)–(8) repeat the previous exercise in the sample of individuals with non-missing NIDs. Variable "Female household head" is computed as the person who receives the property deed. Standard errors are clustered by slum of origin in parentheses. 10%*, 5%**, 1%***.

Table B.2: Displacement effect on annual mortality of adults after correcting for attrition

	1[Died after intervention]				
	All	All	All	Women	Men
	(1)	(2)	(3)	(4)	(5)
Panel A. Weighted by attrition from missing slums					
Displaced	0.220***	0.225***	0.186***	0.091*	0.322***
	(0.056)	(0.056)	(0.055)	(0.047)	(0.083)
Non-displaced mean	0.973	0.973	0.973	0.973	0.973
Panel B. Weighted by attrition from missing NIDs					
Displaced	0.263***	0.267***	0.230***	0.146***	0.353***
	(0.048)	(0.048)	(0.050)	(0.047)	(0.074)
Non-displaced mean	0.973	0.973	0.973	0.813	1.173
Observations	1095816	1095816	1095816	610548	485268
Individuals	29,242	29,242	29,242	15,824	13,418
Municipality of origin FE	✓	✓	✓	✓	✓
Baseline controls	✓	✓	✓	✓	✓
$\hat{p}(X_s)$		✓	✓	✓	✓
$\psi_o \times \hat{p}(X_s)$			✓	✓	✓

Notes: Results equivalent to Table 4. Panel A re-weights the main sample by the inverse probability of finding a slum in the archives. Panel B re-weights the main sample by the inverse probability of having a non-missing NID. Standard errors are clustered by slum of origin in parentheses (95 clusters). 10%*, 5%**, 1%***.