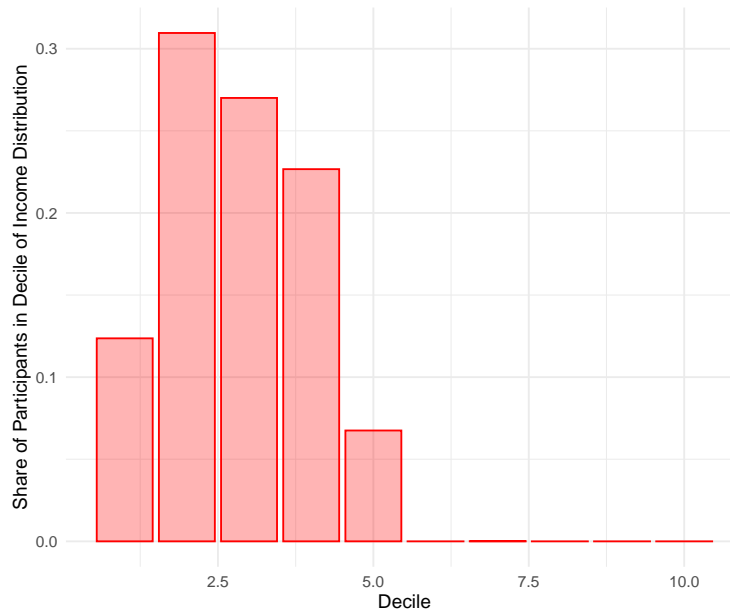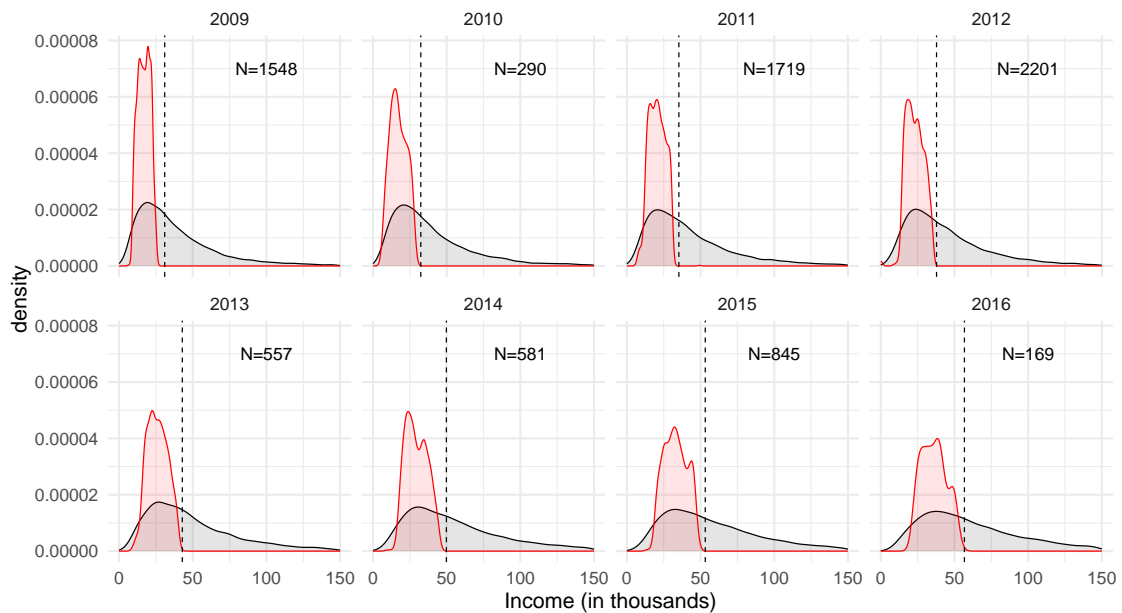# Appendix A   Online Appendix

Figure A.1: Share of Applicants by Decile of Montevideo's Income Distribution

Data on Montevideo's income distribution come from the *Instituto Nacional de Estadística*.

Figure A.2: Applicant Pool and City-Wide Income Distributions, by Year

PDF of applicants in red; city in black. Dashed vertical line marks median of city-wide income distribution. Data on Montevideo's income distribution come from the *Instituto Nacional de Estadística*.

Figure A.3: Location of Montevideo Apartment Buildings

★ Lotteried Unit
• Applicant Origin Residence
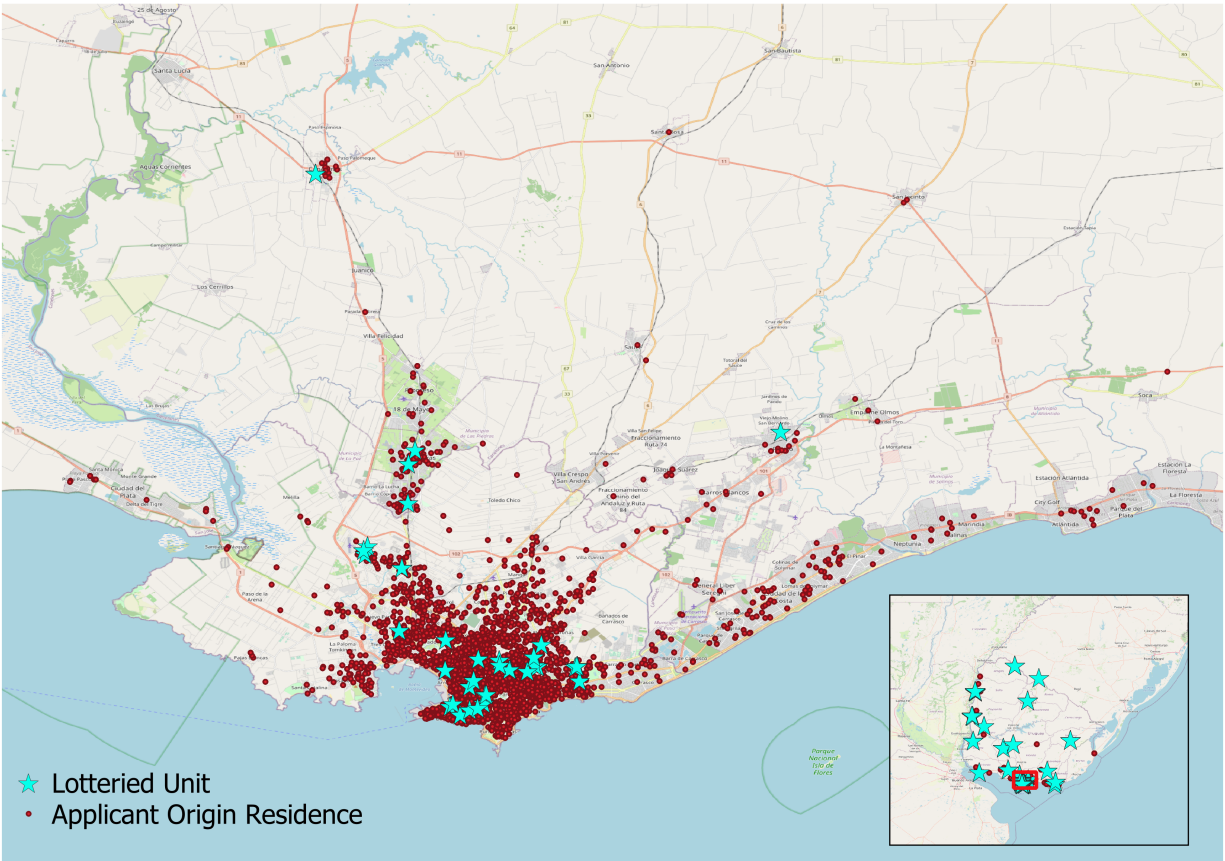
Table A.1: Change in Living Conditions: Housing Characteristics

	(1) Has Own Bathroom	(2) Has Own Kitchen	(3) Connected to Water Network	(4) Connected to Energy Network	(5) Connected to Sewage Network	(6) Housing Quality Index	(7) Number of Bedrooms	(8) Shares Housing with Another Family	(9) HH Has Written Lease
First Winner	0.190***	0.160***	0.0105***	0.00664	0.133***	0.979***	0.356***	-0.231***	0.379***
	(0.0155)	(0.0148)	(0.00390)	(0.00417)	(0.0132)	(0.0450)	(0.0328)	(0.0174)	(0.0203)
Obs	4,883	4,772	4,772	4,772	4,772	4,772	4,883	4,764	4,291
Adj. R^2	0.06	0.06	-0.00	-0.01	0.04	0.14	0.19	0.06	0.11
Control Average	0.81	0.84	0.99	0.99	0.88	9.11	1.99	0.25	0.61
Won First Lottery, Origin Average	0.78	0.82	0.99	1.00	0.81	8.74	1.99	0.29	0.50
Won First Lottery, Destination Average	0.99	1.00	1.00	1.00	0.99	9.95	2.51	0.01	0.99

Notes: Table shows the comparison of household attributes in the final location in which study participants are observed to live before application (Origin) and in the locations that they would move to if they won the lottery (Destination). The control average beneath the table is the average of the dependent variable for families that did not win their first lottery. The two averages beneath this are averages from families that did with their first lottery where the origin average is created using data from lottery applications on their dwellings at the time of their lottery applications. The destination average represents averages of values associated with winning families' prize apartments. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: Change in Living Conditions: Neighborhood Characteristics

|	(1) Price/SqM	(2) Deprivation Index	(3) HS Grad Rate	(4) Homicide Rate	(5) Violent Crime Rate	(6) Assault Rate	(7) Theft Rate	(8) IPV Rate	(9) Neighborhood Home Onwership Rate
Won First Lottery	587.0***	-0.0335**	0.0228***	-1.075	-0.354	-53.47	19.17	-110.5***	-0.00291
	(156.1)	(0.0169)	(0.00567)	(1.155)	(2.298)	(46.08)	(197.6)	(23.12)	(0.00479)
Obs	4,170	4,207	4,206	3,439	3,439	3,439	3,439	3,439	4,207
Adj. R^2	0.31	0.22	0.20	0.06	0.02	0.08	0.01	0.11	0.21
Control Average	4,808.02	0.57	0.33	11.84	56.82	1,174.15	4,496.29	661.32	0.52
Won First Lottery, Origin Average	3,508.67	0.66	0.29	12.26	54.31	1,204.41	4,214.45	704.70	0.54
Won First Lottery, Destination Average	4,226.79	0.65	0.31	12.04	58.68	1,217.23	4,638.39	651.34	0.55

Notes: Table shows the average value of neighborhood attributes in the locations study participants live in at the time of application (Origin) and in the locations that they would move to if they won the lottery (Destination). The control average beneath the table is the average of the dependent variable for families that did not win their first lottery. The two averages beneath this are averages from families that did with their first lottery where the origin average is created using data from lottery applications on their dwellings at the time of their lottery applications. The destination average represents averages of values associated with winning families' prize apartments. The deprivation index is calculated from the fraction of individuals in the census lacking core infrastructure and takes higher values for more deprived neighborhoods. All crime rates are per 100,000 residents per year. Standard errors in parentheses; weighted means and standard deviations reported. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Sample Comparison to Census Averages

	(1) National Average	(2) Unweighted Average of All Segments	(3) Unweighted Average of Applicant Segments	(4) Actual Applicant Average	(5) T-Test: 1-3	(6) T-Test: 1-4	(7) T-Test: 3-4
Rooms	3.28	3.17	3.15	4.57	11.96	-115.98	-131.81
Bedrooms	2.06	1.85	1.8	1.95	55.73	19.18	-35.56
Has Own Bathroom	.91	.88	.96	.81	-26.86	35.09	54.19
Has Own Kitchen	.91	.89	.93	.84	-13.67	26.59	32.99
HH Family Size	4.3	2.8	2.74	3.2	131.86	193.59	-84.31
Live In House	.8	.85	.67	.44	15.39	118.1	40.73
Live In Apartment	.16	.12	.3	.55	-16.92	-123.02	-42.33
Rent Dwelling	.04	.02	.02	.26	37.43	-71.15	-69.23
Water in Household	.93	.76	.96	.99	-9.93	-98.42	-23.2
Electricity In Dwelling	.98	.92	.98	.99	2.67	-16.8	-20
Own Their Dwelling	.57	.55	.55	.00	6.86		660.88

Notes: The first column gives the national average from census data. Column (2) gives the unweighted average of all segments in the country, column (3) gives the average for segments that applicants come from, and column (4) gives the average among actual applicant households. The remaining columns give the t-statistics of the comparisons between the indicated averages. Note that one of the conditions of program participation was that the applicant not already own a home, which is why the "Own Their Dwelling" row is 0 in column 4.

Figure A.4: Two-Sided Noncompliance by Year
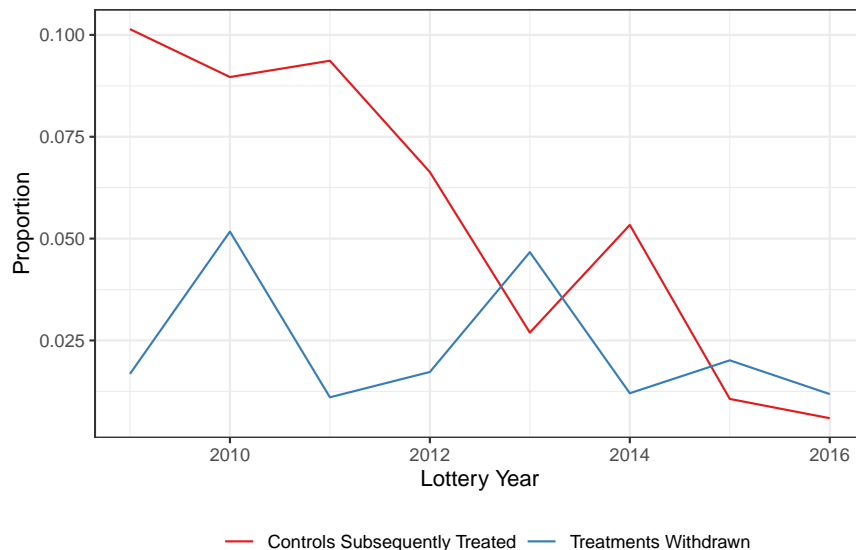
The figure shows the evolution over time of each type of noncompliance. "Controls subsequently treated" gives the fraction of individuals included in a lottery in each year who lost their initial lottery but then entered and won a subsequent one. "Treatments withdrawn" is the fraction of winners in each year who do not occupy the CVN apartment for any reason.

Figure A.5: Differential Noncompliance and Sample Size
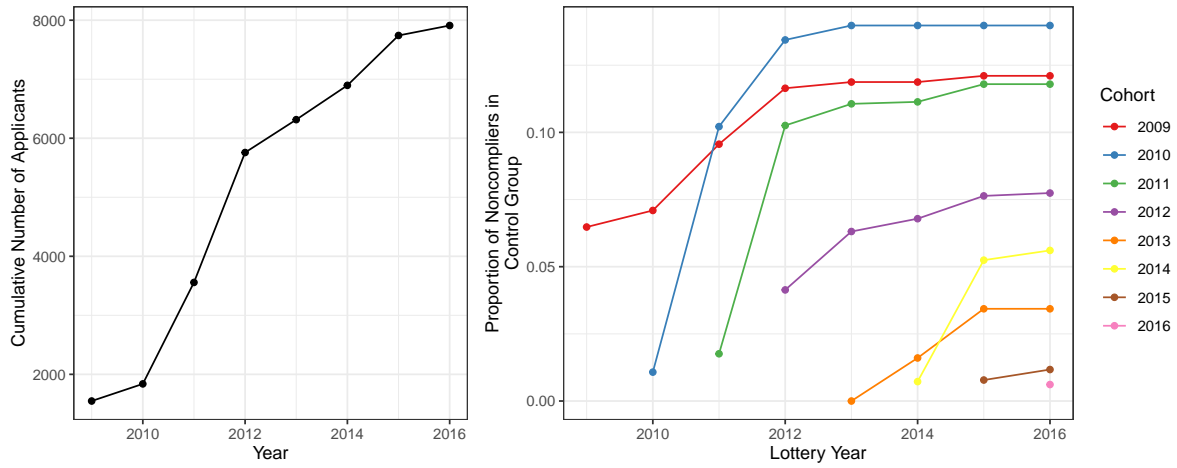
(a) Sample Size Growth

(b) Noncompliance in the Control Group by Year Cohort

Panel A shows the cumulative growth in the number of households who participated in a competitive lottery by year. Panel B shows the evolution of ever winning subsequent lotteries among losers of first lotteries for each year.

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Table A.4: Summary Statistics and Balance

	Control	Treatment	Difference
Information from Application Forms			
Monthly Family Formal Income	23,218.88	21,133.41	-532.075
	(8,511.75)	(8,230.81)	(363.818)
Any Formal Income	0.16	0.15	-.001
	(0.37)	(0.36)	(.019)
Two Titleholders	0.57	0.60	.005
	(0.50)	(0.49)	(.025)
Minor at Lottery	0.43	0.42	.001
	(0.49)	(0.49)	(.006)
Number of Minors at Lottery	1.41	1.40	.005
	(0.66)	(0.65)	(.023)
Origin: House	0.44	0.44	.011
	(0.50)	(0.50)	(.023)
Origin: Rental	0.60	0.54	-.055**
	(0.49)	(0.50)	(.024)
Origin: Number of Bedrooms	1.95	1.95	.005
	(0.82)	(0.81)	(.036)
Origin: Had Restroom	0.81	0.81	-.019
	(0.39)	(0.39)	(.02)
Origin: Under Construction	0.25	0.19	.004
	(0.43)	(0.39)	(.02)
Joint Orthogonality Test F-Stat is 0.96 with P-Value 0.480.			
Pretreatment Outcomes			
Never Unemployed	0.62	0.59	-.034
	(0.49)	(0.49)	(.029)
Never Missed School	0.11	0.11	-.028
	(0.31)	(0.32)	(.026)
Voted	0.05	0.05	-.001
	(0.22)	(0.22)	(.01)
Fertility	0.11	0.11	.013
	(0.32)	(0.32)	(.02)
University	0.03	0.02	-.0074
	(0.17)	(0.15)	(.005)
Joint Orthogonality Test F-Stat is 0.44 with P-Value 0.782.			
Neighborhood Characteristics, Post–Pre			
Real Estate Price Change, Z-Score	-0.01	0.17	.0982*
	(1.03)	(1.12)	(.051)
Deprivation Index Change	-0.02	-0.06	-.1013*
	(0.85)	(0.91)	(.058)
HS Grad Rate Change	0.03	0.09	.0855
	(0.97)	(0.99)	(.057)
Distance, KM	4.51	4.70	.0566
	(3.52)	(3.50)	(.2)
Homicide Change, Z-Score	0.00	0.05	.0184
	(1.00)	(0.98)	(.06)
Violent Crime Change, Z-Score	-0.00	0.01	.0409
	(1.00)	(0.90)	(.048)
Assault Change, Z-Score	-0.00	0.01	.0127
	(1.00)	(0.97)	(.052)
Theft Change, Z-Score	0.00	0.01	.0449
	(1.00)	(0.90)	(.049)
Joint Orthogonality Test F-Stat is 1.05 with P-Value 0.397.			

Notes: Table presents tests of balance for lottery winners versus losers. Panel A examines household data from the application forms; these variables serve as controls for the intention-to-treat (ITT) and local average treatment effect (LATE) estimations in Tables 1 and 2. Panel B uses the institutional data to examine the pre-lottery outcome variables found in Tables 1 and 2. Panel C looks at the change in neighborhood characteristics that would have been induced by winning the lottery. These variables serve as dimensions explored in the heterogeneity analysis in Table A.7. Difference column shows the beta on a treatment indicator representing the lottery outcome of a household the first time it is observed and includes weights and lottery fixed effects as in the main analysis. In all panels, lottery fixed effects are included. In Panels A and B, standard errors are clustered at the household level, while in Panel C, standard errors are clustered at the segment–pair level. In Panel B, the control covariates of Panel A are included to reflect the ANCOVA specifications of Tables 1 and 2. As these control covariates are the variables of interest in Panel A, they are not included in the Panel A specification. Weights are adjusted in Panel B to reflect the number of lotteries a person participated in before she first won a lottery. The F-statistics displayed are from joint orthogonality tests from all variables in the associated panel predicting treatment, with all other elements of that panel's specification held constant as laid out in Bruhn and McKenzie (2009). Standard errors in parentheses; weighted means and standard deviations reported. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: ITT Estimates Without Controls by Lottery Year

	(1) Employment, 09–21	(2) Voting, 08–16	(3) Fertility, 09–16	(4) Schooling, 09–21	(5) University, 09–23
2009 Lottery Cohort	.0036	-.0133	.0044	-.004	.0169
	(.024)	(.01)	(.007)	(.05)	(.015)
	[3,296]	[3,672]	[1,745]	[1,727]	[3,766]
2010 Lottery Cohort	.0687**	-.0141**	.0011	.0454	.0045
	(.029)	(.006)	(.008)	(.047)	(.013)
	[640]	[738]	[369]	[384]	[771]
2011 Lottery Cohort	.0124	-.0083	-.0059	.0474*	.0164
	(.021)	(.008)	(.006)	(.026)	(.015)
	[3,523]	[3,854]	[2,018]	[2,048]	[4,095]
2012 Lottery Cohort	.0116	.0122	.0152	.0053	-.0108
	(.02)	(.009)	(.01)	(.031)	(.012)
	[4,152]	[4,563]	[2,338]	[2,302]	[4,740]
2013 Lottery Cohort	.0435	-.0256***	-.0058	.0307	-.0289***
	(.036)	(.008)	(.015)	(.06)	(.008)
	[1,023]	[1,142]	[608]	[600]	[1,224]
2014 Lottery Cohort	.1051***	.0035	-.0353***	.0009	-.0336***
	(.039)	(.033)	(.008)	(.114)	(.012)
	[1,026]	[1,129]	[589]	[533]	[1,181]
2015 Lottery Cohort	.0215	-.0378***	-.0285***	-.0667	.0087
	(.031)	(.011)	(.008)	(.049)	(.026)
	[1,483]	[1,628]	[830]	[755]	[1,690]
2016 Lottery Cohort	-.2849*	-.0953***	-.0262*	.1009**	-.0672***
	(.151)	(.018)	(.015)	(.047)	(.021)
	[253]	[280]	[163]	[128]	[310]
Pooled Sample	.0249**	-.0068	-.0057	-.0017	-.0067
	(.011)	(.005)	(.004)	(.018)	(.008)
	[15,502]	[17,006]	[8,755]	[7,933]	[17,777]
Pooled Average	0.53	0.05	0.04	0.40	0.08
Sample Eligibility	18 or more years of age	16 or more years of age	Between 15 and 49 years of age	Between 6 and 19 years of age	Between 17 and 40 years of age

Notes: Table presents intention-to-treat (ITT) impacts of the winning status in the first lottery entered for the cohort included in each lottery, retaining the lottery fixed effects but without covariates or the ANCOVA baseline outcome control. Outcome is cumulated across all available post-lottery years. Every coefficient is from a separate regression. Regressions include fixed effects for lottery and are weighted using randomization inverse propensity weights. The pooled sample result in the final row includes all lottery years. Note that the number of observations within a column does not sum to the pooled sample due to re-entry. Employment: Avg Number of Years without gap in Employment, 09–21. Voting: Avg Participation Across Post-Treatment Years , 08–16. Fertility: Avg Births Across Post-Treatment Years, 09–16. Schooling: Avg Number of Years without Gap in Schooling, 09–21. University: Attended, 09–23. Standard errors in parentheses; number of outcomes per regression in brackets; * p<0.10 ** p<0.05 *** p<0.01.

Table A.6: LATE Estimates Without Controls by Lottery Year

	(1) Employment, 09–21	(2) Voting, 08–16	(3) Fertility, 09–16	(4) Schooling, 09–21	(5) University, 09–23
2009–2010 Cohorts		-.0081 (.0051) [4,410]	.002 (.0032) [2,114]		-.0053 (.0061) [4,537]
2009–2011 Cohorts	.0147** (.007) [7,565]	-.0053* (.003) [8,264]	.0001 (.002) [4,136]	.0069 (.0113) [3,857]	-.0022 (.0039) [8,632]
2009–2012 Cohorts	.0108** (.0048) [11,717]	-.0034* (.002) [12,827]	.0001 (.0014) [6,496]	.0035 (.0076) [5,987]	-.0017 (.0028) [13,372]
2009–2013 Cohorts	.0082** (.0036) [12,740]	-.0024* (.0015) [13,969]	-.0001 (.0011) [7,111]	.0036 (.0056) [6,559]	-.0016 (.0021) [14,596]
2009–2014 Cohorts	.0068** (.0029) [13,766]	-.0016 (.0012) [15,098]	-.0005 (.0009) [7,723]	.0028 (.0045) [7,072]	-.0011 (.0017) [15,777]
2009–2015 Cohorts	.0057** (.0024) [15,249]	-.0015 (.001) [16,726]	-.0007 (.0008) [8,586]	.0018 (.0037) [7,805]	-.0011 (.0014) [17,467]
2009–2016 Cohorts	.0049** (.002) [15,502]	-.0013 (.0008) [17,006]	-.0007 (.0007) [8,755]	.0013 (.0031) [7,933]	-.001 (.0012) [17,777]
Pooled Average	0.52	0.05	0.04	0.39	0.07
Sample Eligibility	18 or more years of age	16 or more years of age	Between 15 and 49 years of age	Between 6 and 19 years of age	Between 17 and 40 years of age

Notes: Local average treatment effect (LATE) analysis instrumenting for years treated in 2016 with the outcome of the first lottery in which a household participated within each observation window, retaining the lottery fixed effects but without covariates or the ANCOVA baseline outcome control. Each coefficient is the output from a separate regression, cumulating across all cohorts that had been included in a lottery prior to a given year. Regressions include fixed effects for lottery and are weighted using randomization inverse propensity weights. Standard errors clustered at the household level in parentheses; number of observations for each analysis is in brackets; * p<0.10 ** p<0.05 *** p<0.01.

Table A.7: Total Fertility among All Women with Fertility Data

	(1) Total N Children by 2017	(2) Total N Children by 2017	(3) Total N Children by 2017
Treatment assignment from first lottery participated in	-0.00413 (0.0385)	0.0275 (0.0379)	-0.0105 (0.0265)
Observations	8,755	8,755	8,755
Control Average	1.23	1.23	1.23
Controls	N	N	Y
Lottery FE	N	Y	Y

Notes: Table presents estimates of treatment effects on the 2017 total number of children among women of fertile age who were exposed to the experiment. Standard errors in parentheses; * p<0.10 ** p<0.05 *** p<0.01.

Table A.8: Test of Significance of Impact Differences Across Lottery Years

	(1) Model 1; Time Interactions Only	(2) Model 2; Time & Covar Interactions
Employment F-Stat	.681 [0.689]	.258 [0.97]
Voting F-Stat	2.425 [0.018]**	1.97 [0.056]*
Fertility F-Stat	2.283 [0.025]**	1.443 [0.184]
Schooling F-Stat	2.091 [0.041]**	1.012 [0.421]
College F-Stat	.703 [0.67]	.678 [0.69]

Notes: Column (1) of this table repeats the intention-to-treat (ITT) estimation in Table 2, pooling together all cohorts and estimating (lottery year) x (treatment) interactions. It reports the F-statistic on the joint significance of these interaction terms and so tests for the differences across years for each outcome. Column (2) repeats the same exercise but now also includes covariates on the applicants interacted with treatment. Comparison of the two columns therefore illustrates how much of the cross-year impact differential arises from observable differences across cohorts. Covariates included in column (2) include de-meaned versions of distance between applicant's home and the lottery household in kilometers; travel time between applicant's home and the lottery household in minutes; number of apartments being allocated in the specific lottery; a dummy for whether the lottery counted toward disabled quota; latitude and longitude of the lottery apartments; price per square foot of the lottery apartment; market price of the lottery apartment; difference in origin- and destination-segment rates for homicide, assault, theft and intimate partner violence; number of lottery entrants; number of winners selected for the lottery; simple probability of winning; dummies for whether the applicant lived in a house, apartment, unhealthy environment, floodable environment, rental, a unit she owned, a unit with a written lease, a unit with commercial usage, a unit she constructed herself, a unit with a proper floor, a unit connected to the sewage network, a unit connected to the electrical grid, or a unit with construction issues; the applicant's age at the date of the lottery drawing; the department of applicant origin; formal monthly income; a dummy for any informal income; a dummy for whether the applicants specified two nominees to be winners; a dummy for whether the applicant was a minor a the time of the lottery; and the total number of children. P-values on the F-tests are in brackets.

Table A.9: Treatment Effect Heterogeneity by Change in Neighborhood Characteristics

	(1) Employment, 09–21	(2) Voting, 08–16	(3) Fertility, 09–16	(4) Schooling, 09–21	(5) University, 09–23
Real Estate Price Change, Z-Score	-.0102 (.011) [13,345]	-.0034 (.005) [14,629]	-.0013 (.004) [7,527]	.0001 (.019) [6,822]	-.0076 (.008) [11,260]
Deprivation Index Change, Z-Score	.0166* (.01) [13,487]	.0014 (.003) [14,782]	.006 (.004) [7,615]	-.0085 (.019) [6,901]	-.0029 (.009) [11,443]
HS Grad Rate Change, Z-Score	-.0207** (.011) [13,481]	.0043 (.004) [14,776]	-.0074** (.004) [7,612]	.0023 (.021) [6,901]	-.0002 (.009) [11,437]
Distance, KM	-.001036 (.00101) [13,532]	.000038 (.00017) [14,831]	.000018 (.00014) [7,637]	.000246 (.00102) [6,918]	-.000051 (.00055) [11,479]
Homicide Change, Z-Score	.0267** (.01) [11,470]	-.0014 (.006) [12,551]	-.0034 (.006) [6,440]	-.0217 (.02) [5,763]	.0058 (.012) [9,199]
Violent Crime Change, Z-Score	-.0112 (.01) [11,470]	.005 (.007) [12,551]	.0015 (.005) [6,440]	.0198 (.022) [5,763]	-.0068 (.011) [9,199]
Assault Change, Z-Score	-.0134 (.012) [11,470]	-.0007 (.006) [12,551]	.0052 (.004) [6,440]	.0221 (.022) [5,763]	.0001 (.008) [9,199]
Theft Change, Z-Score	-.01 (.01) [11,470]	.006 (.007) [12,551]	.0005 (.005) [6,440]	.018 (.022) [5,763]	-.0091 (.012) [9,199]
Pooled Average	0.53	0.05	0.04	0.40	0.08
Sample Eligibility	18 or more years of age	16 or more years of age	Between 15 and 49 years of age	Between 6 and 19 years of age	Between 17 and 40 years of age

Notes: Every block of results in this table is from a different regression, where we use the pooled intention-to-treat (ITT) specification and include both treatment and the covariate and report only the interaction effect on (treatment) x (covariate). Each dimension of heterogeneity in this table describes the difference between the attribute in the destination neighborhood minus that in the origin neighborhood. For example, the Homicide Change, Z-Score result for employment can be interpreted as individuals who move to a neighborhood with a higher homicide rate than that in their origin location experiencing fewer gaps in employment. Note that, for the deprivation index, a higher value implies more deprivation and so a positive change implies a move to a more deprived location. Standard errors in parentheses; number of observations in brackets. * p<0.10 ** p<0.05 *** p<0.01.

Table A.10: Heterogeneity Analysis by Distance

	(1) Employment, 09–21	(2) Voting, 08–16	(3) Fertility, 09–16	(4) Schooling, 09–21	(5) University, 09–23
Distance, KM	-.000276	-.000202*	-.000032	.000101	-.000124
	(.00027)	(.00011)	(.0001)	(.00054)	(.00045)
Treatment	.03423***	-.010012*	-.005199	.002409	-.012926
	(.0119)	(.0052)	(.00431)	(.0199)	(.00911)
Interaction	-.001036	.000038	.000018	.000246	-.000051
	(.00101)	(.00017)	(.00014)	(.00102)	(.00055)
	[13,532]	[14,831]	[7,637]	[6,918]	[11,479]
Pooled Average	0.53	0.05	0.04	0.40	0.08
Sample Eligibility	18 or more years of age	16 or more years of age	Between 15 and 49 years of age	Between 6 and 19 years of age	Between 17 and 40 years of age

Notes: This table shows the details of the analysis of heterogeneity by distance presented in the last row of Table A.9. Treatment is a dummy for winning the first lottery entered, Distance is the linear distance in kilometers from the location lived in at the time of application to the where the new house would be if won, and Interaction is the interaction between these. Given the interaction term, the Treatment dummy gives the linearized intercept estimate of what the impact of the program would be for in individual who did not move at all, meaning that the new house was in the exact same location as the original one. * p<0.10 ** p<0.05 *** p<0.01.

Figure A.6: Lottery and Applicant Characteristics by Cohort Year

Lotteries

Nr. of applicants — Nr. of apartments — Apartment Price — Price m2 — Special Needs Unit

Applicant Family Structure

Nr. of adults — Nr. of children — Female HH head — Average HH age — Nr. nominees

Applicant Income

Savings — Formal monthly income — Informal monthly income — Nr. members w/income — Rent up to date

Applicant Housing

Written lease — Nr. of rooms — Nr. of bedrooms — Has flooding problems — Has own kitchen

Has own bathroom — Has electrical connection — Has sewage connection

Applicant Neighborhood

Deprivation Index — HS grad rate — Ownership rate — Homicide rate — Theft rate

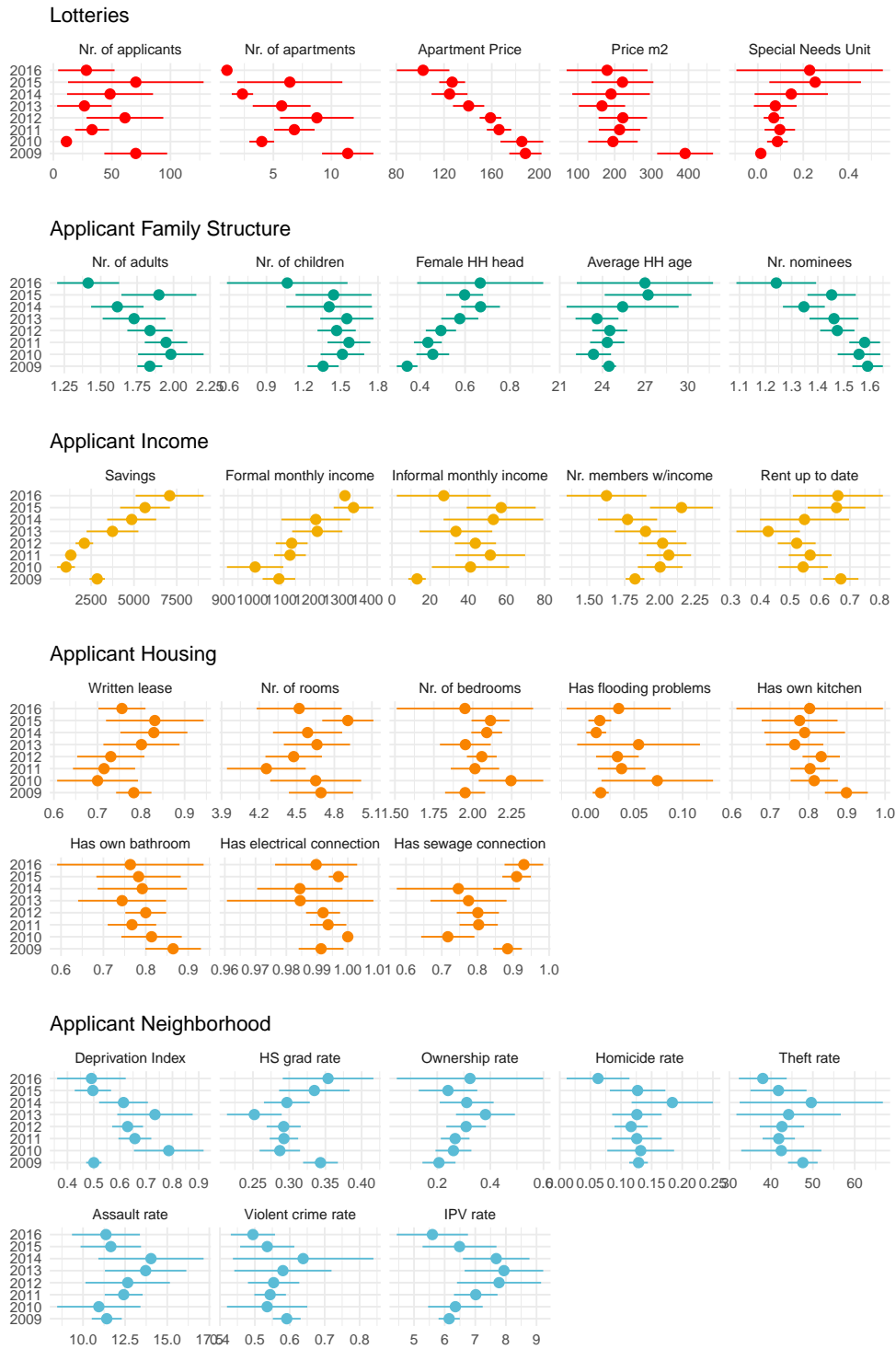Assault rate — Violent crime rate — IPV rate

Figure provides the coefficient and standard error on dummies for lottery year in a regression where the outcome variable is the indicated covariate and the constant term is suppressed so the coefficients give the average value within each year. Prices and income measured in 2008 USD.