

Supplementary Information

The appeal of large cities may not wane due to the COVID-19 pandemic and remote working: The case of Tokyo, Japan

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Supplementary Tables

Supplementary Table 1: Number of respondents by group and wards.

	Control x Control	Reminder x Control	Control x Remote	Reminder x Remote	Total
Tokyo 23 wards					
Adachi	14	17	14	9	54
Arakawa	19	11	16	9	55
Bunkyo	10	15	14	10	49
Chiyoda	10	15	12	11	48
Chuo	13	16	10	19	58
Edogawa	17	14	11	13	55
Itabashi	19	9	15	14	57
Katsushika	8	16	15	14	53
Kita	11	13	15	15	54
Koto	13	15	16	18	62
Meguro	13	13	14	12	52
Minato	13	19	14	11	57
Nakano	16	13	15	12	56
Nerima	13	14	12	14	53
Ota	15	10	13	14	52

Setagaya	14	12	20	11	57
Shibuya	14	10	9	12	45
Shinagawa	8	20	10	19	57
Shinjuku	19	12	15	12	58
Suginami	11	13	17	17	58
Sumida	12	17	8	9	46
Taito	12	11	12	14	49
Toshima	10	4	18	10	42
Tama Region	27	21	27	31	106
Total	331	330	342	330	1,333

Supplementary Table 2: Conjoint Experiment Design Attributes and Levels.

Attributes	Levels
Housing Types	1. Fully-detached house 2. Terrace house ¹ 3. Apartment/Mansion (Multifamily residential) ¹
Neighborhood Types	1. Inner City (5 areas) 2. 23 wards 3. Out of 23 wards within Tokyo 4. Outside Tokyo
Amenities Services Facility Availability ²	1. Convenience store 2. Convenience store, groceries store & supermarket 3. Convenience store, groceries store & supermarket, and medical services
Urban Green Space Availability ²	1. Local (small playground & few sitting places) 2. Large park (large playground with space for jogging and sports)
Strong Community Network and Social Support	1. Not Available 2. Available
Public Transportation Availability ²	1. No 2. Bus Station 3. Train Station
Commune Mode	1. Walking 2. Cycling 3. Private car/moped

	4. Public transport
Noise Pollution	1. Not so quiet in both day and night 2. Not so quiet in day but quiet in night 3. Always quiet

Notes:

1. Terrace house refers to housing with shared side walls with neighbor either on one side or both. Apartment or Mansion is any multifamily residential with at least two floors and shared common areas such as main entrances, staircases, elevators and etc.
2. Availability refers to accessibility within 15 minutes of walking distance.

Supplementary Table 3: Breakdown of respondents by treatment groups.

		Remote work option	
		Control	Remote
A reminder of future pandemic occurrences	Control	331	342
	Reminder	330	330

Supplementary Table 4: Descriptive statistics of respondents.

	N (Total)	Group			
		Control x Control	Reminder x Control	Control x Remote	Reminder x Remote
<i>Household income category</i>					
Low-income group (< 4 Mils.)	344	92	83	89	80
		26.74	24.13	25.87	23.26
Middle-income group (4 Mils. -7 Mils.)	382	97	92	95	98
		25.39	24.08	24.87	25.65
High-income group (>7 Mils.)	597	139	153	157	148
		23.28	25.63	26.30	24.79
N (Total)	1323	328	328	341	326
		24.79	24.79	25.77	24.64
<i>Age category</i>					
≤ 39	302	76	67	77	82
		25.17	22.19	25.50	27.15
40 - 59	702	173	178	185	166
		24.64	25.36	26.35	23.65
≥ 60	329	82	85	80	82
		24.92	25.84	24.32	24.92
N (Total)	1333	331	330	342	330
		24.83	24.76	25.66	24.76
<i>Employment status</i>					
Full Time	771	190	183	195	203
		24.64	23.74	25.29	26.33
Part-Time	162	40	44	44	34
		24.69	27.16	27.16	20.99
Self-employed	135	31	41	29	34
		22.96	30.37	21.48	25.19
Unemployed	261	67	62	74	58
		25.67	23.75	28.35	22.22
N (Total)	1329	328	330	342	329
		24.68	24.83	25.73	24.76
<i>Education level</i>					
Upper secondary	234	51	62	64	57
		21.79	26.5	27.35	24.36
Post-secondary, bachelor, or equivalent	980	250	243	245	242
		25.51	24.8	25	24.69
Post-graduate	115	27	25	33	30
		23.48	21.74	28.7	26.09

	N (Total)	1329	328	330	342	329
			24.68	24.83	25.73	24.76
<i>Commute time</i>						
<30 mins		480	106	139	108	127
			22.08	28.96	22.5	26.46
30 mins – 1 hour		478	133	105	129	111
			27.82	21.97	26.99	23.22
> 1 hour		108	23	22	31	32
			21.3	20.37	28.7	29.63
	N (Total)	1066	262	266	268	270
			24.58	24.95	25.14	25.33
<i>Current residence-related variables (All the variables below only include those who reported yes or available)</i>						
House owner: Yes		725	186	175	195	169
			25.66	24.14	26.9	23.31
Fully detached houses resident: Yes		339	70	84	86	99
			20.65	24.78	25.37	29.2
Availability of open space attached to house: At least one side		636	157	164	166	149
			24.69	25.79	26.1	23.43
<i>Availability of facilities within 15 mins walk</i>						
Open green spaces: Yes		930	230	233	243	224
			24.73	25.05	26.13	24.09
Groceries store: Yes		1263	315	313	326	309
			24.94	24.78	25.81	24.47
Convenience store: Yes		1289	321	321	331	316
			24.9	24.9	25.68	24.52
Medical services: Yes		1175	290	299	306	280
			24.68	25.45	26.04	23.83
<i>Variables related to pandemic or changes after pandemic</i>						
Worse mentality after pandemic: Yes		513	129	128	126	130
			38.97	37.43	38.18	39.39
Change of transportation mode after pandemic: Yes		111	36	27	26	22
			11.15	7.74	8.23	6.83
Self or family members ever affected by Covid-19: Yes		241	48	73	62	58
			14.86	18.45	22.26	18.07

For each variable, frequency is reported in the first row, and percentage is reported in second row. Some variable's total response is less than total no. of obs. (1333) due to missing/incomplete or inapplicable response. Total response is reported in a row after groups of variables that sum to 100% of the respondents, eg: HH income category, age category etc. All variables after current residence-related variables reports the frequency of yes. The second row of these variables reported mean value of the dummy variable.

Supplementary Table 5: Mean differences of the control group with three different treatments groups.

	(1) vs Reminder x Control	(2) vs Control x Remote	(3) vs Reminder x Remote
<i>Household income category</i>			
Low-income group (< 4 Mils.)	0.027 (0.035)	0.020 (0.034)	0.035 (0.035)
Middle-income group (4 Mils.-7 Mils.)	0.015 (0.035)	0.017 (0.035)	-0.006 (0.036)
High-income group (>7 Mils.)	-0.043 (0.039)	-0.037 (0.038)	-0.030 (0.039)
<i>Age category</i>			
≤ 39	0.027 (0.032)	0.004 (0.032)	-0.019 (0.033)
40 - 59	-0.017 (0.039)	-0.018 (0.039)	0.020 (0.039)
≥ 60	-0.010 (0.033)	0.013 (0.033)	-0.001 (0.034)
<i>Employment status</i>			
Full Time	0.025 (0.039)	0.009 (0.038)	-0.038 (0.038)
Part-Time	-0.011 (0.026)	-0.007 (0.026)	0.019 (0.025)
Self-employed	-0.030 (0.024)	0.010 (0.022)	-0.009 (0.023)
<i>Education level</i>			
Upper secondary	-0.032 (0.029)	-0.032 (0.029)	-0.018 (0.029)
Post-secondary, bachelor, or equivalent	0.026 (0.034)	0.046 (0.034)	0.027 (0.034)
Post-graduate	0.007 (0.021)	-0.014 (0.022)	-0.009 (0.022)
<i>Commute time</i>			
<30 mins	-0.118*** (0.043)	0.002 (0.043)	-0.066 (0.043)
30 mins – 1 hour	0.113*** (0.043)	0.026 (0.044)	0.097** (0.043)
> 1 hour	0.005 (0.024)	-0.028 (0.026)	-0.031 (0.026)
<i>Current residence-related variables</i>			
House Owner	0.037	-0.005	0.049

Fully detached houses	(0.039) -0.041 (0.033)	(0.038) -0.040 (0.033)	(0.039) -0.091*** (0.034)
Availability of open space attached to house	-0.020 (0.039)	-0.013 (0.039)	0.022 (0.039)
<i>Availability of facilities within 15 mins walk</i>			
Open green spaces	0.007 (0.035)	-0.001 (0.035)	0.039 (0.036)
Groceries store	0.012 (0.014)	-0.004 (0.012)	0.016 (0.014)
Convenience store	0.006 (0.008)	-0.000 (0.006)	0.009 (0.008)
Medical services	-0.025 (0.023)	-0.021 (0.023)	0.026 (0.025)
Mentality status	-0.008 (0.010)	-0.016 (0.010)	0.004 (0.010)
Change of transportation mode after the pandemic	0.029 (0.023)	0.034 (0.023)	0.043* (0.023)
Self or family members ever affected by Covid-19	-0.074** (0.030)	-0.036 (0.029)	-0.032 (0.029)
<i>N</i>	661	673	661

All variables are dummy variables. The control group consists of 331 respondents. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Supplementary Table 6: AMCEs result of all samples and RCT sub-sample groups.

	All Sample		RCT Sub-sample groups			
	(1) Free-choice	(2) Force-Choice	(3) Control x Control	(4) Reminder x Control	(5) Control x Remote	(6) Reminder x Remote
<i>Housing Types (Baseline: Fully-detached House)</i>						
Terrace House	-0.019** (0.009)	-0.040*** (0.009)	-0.012 (0.018)	-0.006 (0.018)	-0.042** (0.018)	-0.016 (0.017)
Apartment/Mansion	0.009 (0.009)	0.014 (0.009)	0.019 (0.017)	0.017 (0.018)	-0.004 (0.018)	0.001 (0.017)
<i>Neighborhood Types (Baseline: Inner City (5 areas))</i>						
Tokyo 23 Wards	-0.021** (0.010)	-0.000 (0.010)	-0.015 (0.022)	-0.020 (0.020)	-0.017 (0.021)	-0.031 (0.021)
Out of 23 wards within Tokyo	-0.058*** (0.010)	-0.115*** (0.012)	-0.076*** (0.022)	-0.068*** (0.021)	-0.031 (0.020)	-0.060*** (0.020)
Outside Tokyo	-0.047*** (0.010)	-0.166*** (0.012)	-0.055*** (0.021)	-0.037* (0.020)	-0.061*** (0.020)	-0.037* (0.022)
<i>Amenities Services Facilities Availability (Baseline: Convenience Store only)</i>						
Convenience Store & Supermarket	0.023*** (0.008)	0.056*** (0.009)	0.019 (0.017)	0.027 (0.017)	-0.002 (0.018)	0.047*** (0.017)
Convenience Store, Supermarket & Medical services	0.010 (0.009)	0.081*** (0.009)	0.004 (0.017)	0.008 (0.017)	0.003 (0.019)	0.027* (0.016)
<i>Urban Green Space Availability (Baseline: Local park)</i>						
Large Park	0.009 (0.007)	0.012* (0.007)	0.022 (0.014)	0.009 (0.014)	-0.009 (0.015)	0.012 (0.015)
<i>Strong Community Network and Social Support Availability (Baseline: Not available)</i>						
Available	0.004	0.013*	-0.003	-0.010	0.014	0.015

	(0.007)	(0.007)	(0.014)	(0.016)	(0.015)	(0.015)
<i>Public Transport Availability (Baseline: Not available)</i>						
Bus Stop	-0.005 (0.009)	0.031*** (0.009)	-0.006 (0.018)	-0.006 (0.017)	-0.000 (0.018)	-0.011 (0.018)
Train Station	0.011 (0.009)	0.092*** (0.009)	0.019 (0.017)	0.016 (0.018)	0.015 (0.018)	-0.010 (0.018)
<i>Commune Mode (Baseline: Walking)</i>						
Cycling	-0.009 (0.010)	-0.026** (0.011)	-0.024 (0.020)	-0.007 (0.020)	-0.002 (0.021)	-0.007 (0.021)
Private car/Moped	-0.025** (0.011)	-0.064*** (0.010)	-0.033 (0.021)	-0.032 (0.021)	-0.031 (0.020)	-0.004 (0.022)
Public Transport	-0.017 (0.010)	-0.005 (0.010)	-0.027 (0.021)	-0.015 (0.021)	-0.053*** (0.020)	0.026 (0.021)
<i>Noise Pollution (Baseline: Not so quiet both day and night)</i>						
Not so quiet in day but quiet in night	0.028*** (0.009)	0.071*** (0.009)	0.021 (0.017)	0.044*** (0.016)	0.002 (0.018)	0.046** (0.018)
Always quiet	0.029*** (0.009)	0.100*** (0.009)	0.009 (0.016)	0.043** (0.017)	0.005 (0.018)	0.061*** (0.018)
Constant	0.410*** (0.018)	0.446*** (0.015)	0.411*** (0.036)	0.380*** (0.034)	0.480*** (0.037)	0.370*** (0.036)
Observations	18,662	18,662	4,634	4,788	4,620	4,620

This table shows the OLS estimation of the effects of randomly assigned residence attribute values on the probability of being preferred as a residence in the coming five years of all samples in column 1 & 2 and RCT sub-sample groups in column 3 to 6. Free-choice column represents where one can choose to move to the proposed residences or stay at the current places. Force-choice column represents the situation where one is forced to decide between the two proposed residences. Column 3 to 6 is the free-choice situation for sub-sample group. Robust clustered standard errors by respondents in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Supplementary Table 7: AMCEs result of RCT sub-sample groups with control variables.

	RCT Sub-sample groups			
	(1) Control x Control	(2) Reminder x Control	(3) Control x Remote	(6) Reminder x Remote
<i>Housing Types (Baseline: Fully-detached House)</i>				
Terrace House	-0.011 (0.018)	-0.003 (0.017)	-0.043** (0.018)	-0.018 (0.016)
Apartment/Mansion	0.019 (0.017)	0.016 (0.018)	-0.005 (0.018)	0.004 (0.017)
<i>Neighborhood Types (Baseline: Inner City (5 areas))</i>				
Tokyo 23 Wards	-0.015 (0.022)	-0.019 (0.020)	-0.019 (0.021)	-0.033* (0.020)
Out of 23 wards within Tokyo	-0.074*** (0.022)	-0.068*** (0.021)	-0.032 (0.020)	-0.064*** (0.020)
Outside Tokyo	-0.056*** (0.021)	-0.037* (0.020)	-0.064*** (0.020)	-0.038* (0.021)
<i>Amenities Services Facilities Availability (Baseline: Convenience Store only)</i>				
Convenience Store & Supermarket	0.018 (0.017)	0.028* (0.016)	-0.005 (0.017)	0.049*** (0.016)
	0.003	0.004	0.002	0.023
Convenience Store, Supermarket & Medical services	(0.016)	(0.017)	(0.019)	(0.016)
<i>Urban Green Space Availability (Baseline: Local park)</i>				
Large Park	0.018 (0.014)	0.010 (0.014)	-0.008 (0.014)	0.011 (0.015)
<i>Strong Community Network and Social Support Availability (Baseline: Not available)</i>				
Available	-0.005 (0.014)	-0.010 (0.016)	0.015 (0.015)	0.017 (0.015)
<i>Public Transport Availability (Baseline: Not available)</i>				
Bus Stop	-0.007 (0.018)	-0.002 (0.017)	0.001 (0.018)	-0.011 (0.018)
Train Station	0.022 (0.017)	0.018 (0.018)	0.014 (0.018)	-0.011 (0.018)
<i>Commune Mode (Baseline: Walking)</i>				
Cycling	-0.024 (0.020)	-0.007 (0.020)	0.001 (0.020)	-0.008 (0.021)

Private car/Moped	-0.031 (0.021)	-0.031 (0.020)	-0.031 (0.020)	-0.008 (0.022)
Public Transport	-0.027 (0.020)	-0.017 (0.020)	-0.052*** (0.020)	0.023 (0.021)
<i>Noise Pollution (Baseline: Not so quiet both day and night)</i>				
Not so quiet in day but quiet in night	0.020 (0.017)	0.045*** (0.016)	0.003 (0.018)	0.046** (0.018)
Always quiet	0.007 (0.017)	0.044** (0.017)	0.004 (0.018)	0.063*** (0.018)
<i>Control variables:</i>				
Commune time<30 mins	0.010 (0.051)	0.036 (0.050)	0.074 (0.051)	-0.041 (0.049)
Commune time 30 mins – 1 hour	0.001 (0.083)	0.035 (0.094)	0.005 (0.082)	-0.116 (0.078)
Commune time>1 hour	-0.123** (0.059)	-0.097* (0.055)	-0.063 (0.060)	-0.113* (0.058)
Current residing: Fully detached houses	-0.059 (0.055)	-0.071 (0.049)	-0.031 (0.050)	-0.097** (0.046)
Change of transportation mode after pandemic	0.020 (0.064)	-0.092 (0.079)	-0.060 (0.083)	0.080 (0.071)
Self or family ever affected Covid-19	-0.007 (0.058)	0.092* (0.052)	0.095* (0.054)	-0.024 (0.051)
Intercept	0.447*** (0.051)	0.388*** (0.046)	0.462*** (0.052)	0.448*** (0.048)
Observations	4,634	4,620	4,788	4,620

This table shows the OLS estimation of the effects of randomly assigned residence attribute values on the probability of being preferred as a residence in the coming five years of RCT sub-sample group in free choice situation Robust clustered standard errors by respondents in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Supplementary Figures

	Residence A	Residence B
Mode of Transport to Office	Walking	Private Car/Moped
Strong Community Network & Social Supports	Not Available	Not Available
Open Green Accessibility	Local(small playground & few sitting places)	Local(small playground & few sitting places)
Public Transportation Accessibility	Bus Station	Train Station
Housing Type	Fully-detached house	Row house
Amenities Services Accessibility	Convenience store, groceries store or supermarket, medical services	Convenience store, groceries store or supermarket
Noise Pollution	Always quiet	Always quiet
Neighbor Type	Outside Tokyo	Out of 23 wards within Tokyo

Notes: Accessibility refers to within 15 minutes of walking distance

Please drag and arrange the choices below according to your preferences (1 as most favorable; 3 as least favorable):

[Please note that you will not be able to return to this page after clicking the "Next" button]

Residence A

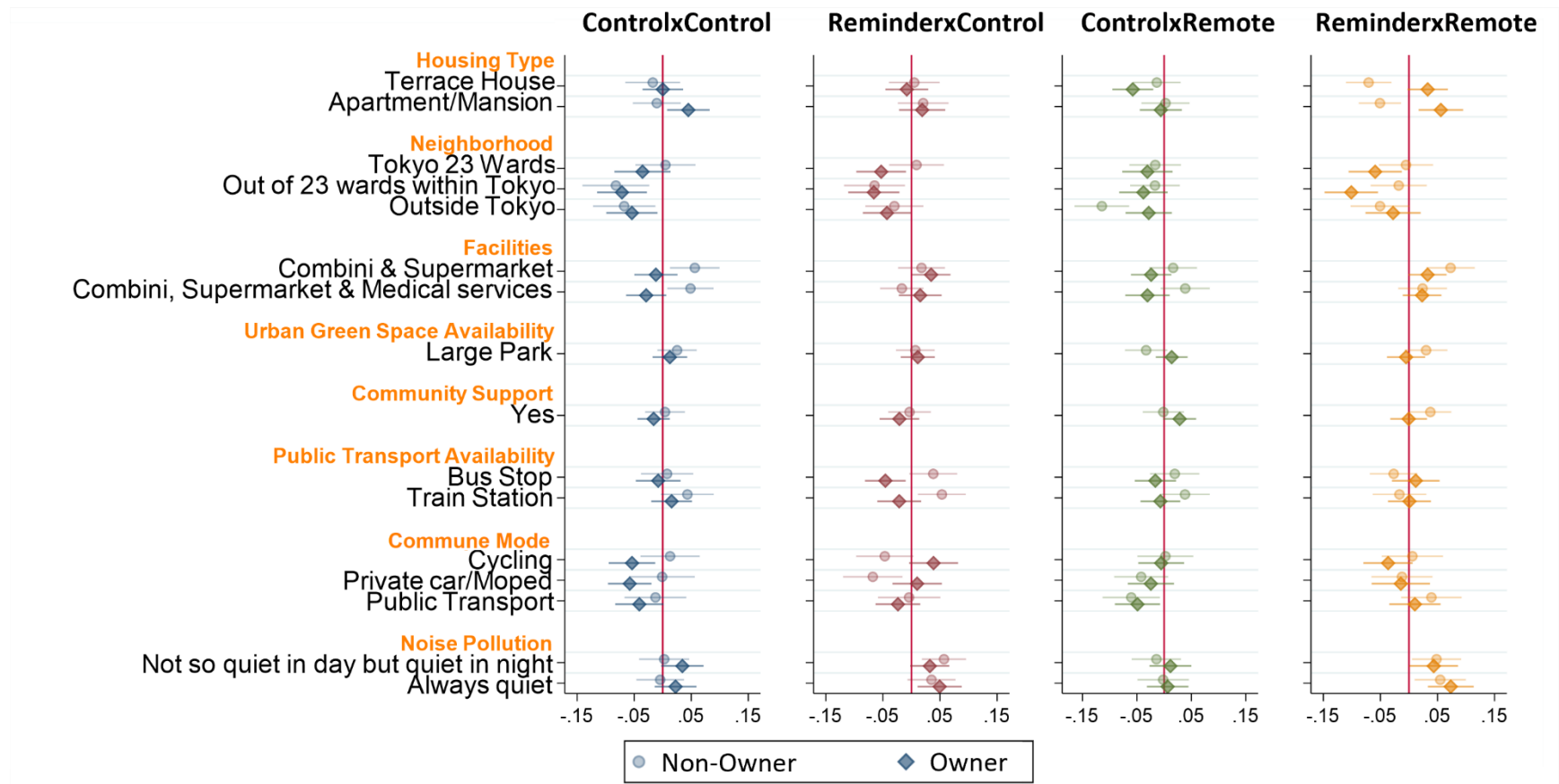
Residence B

Don't move from current place

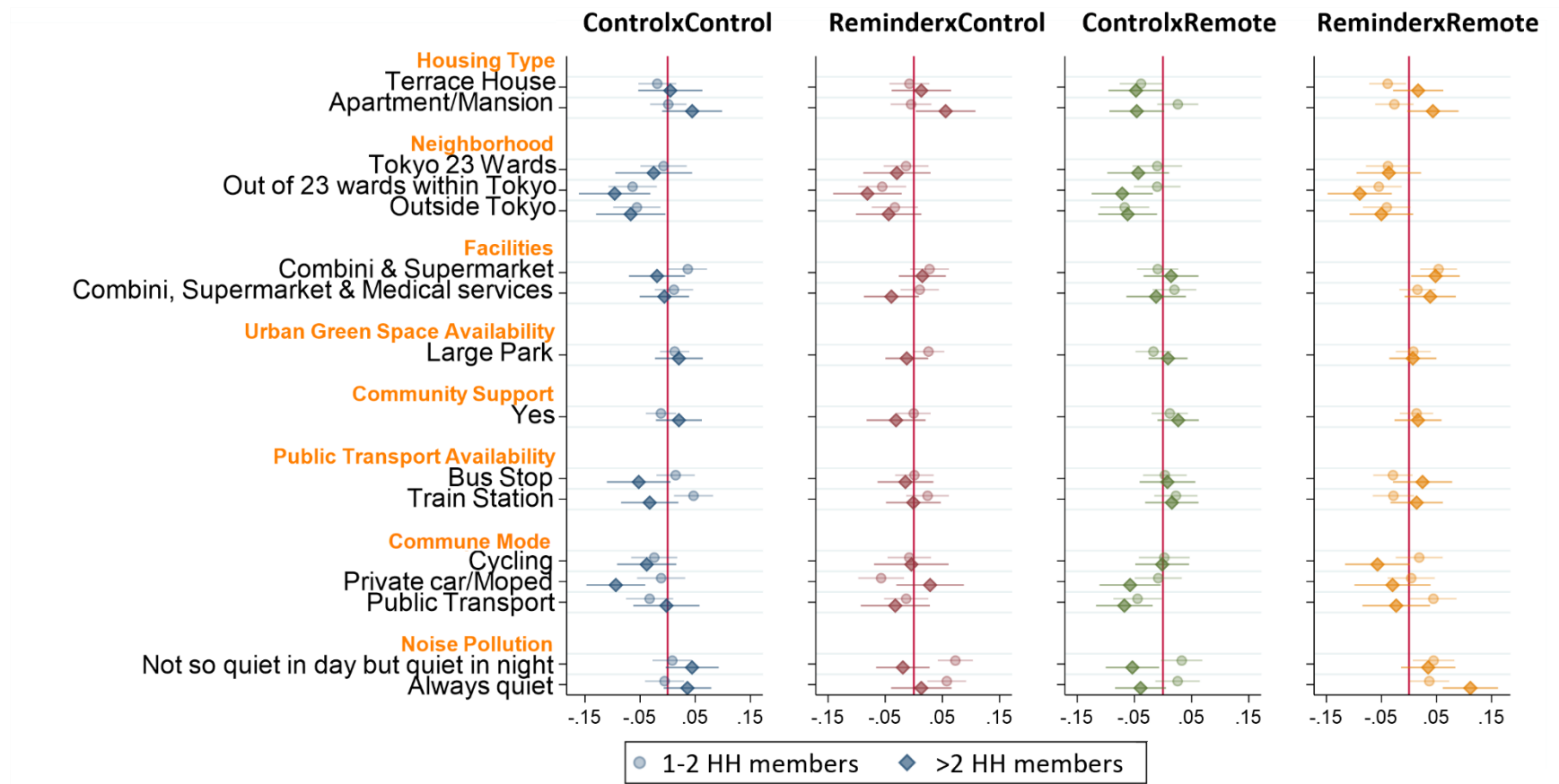
←

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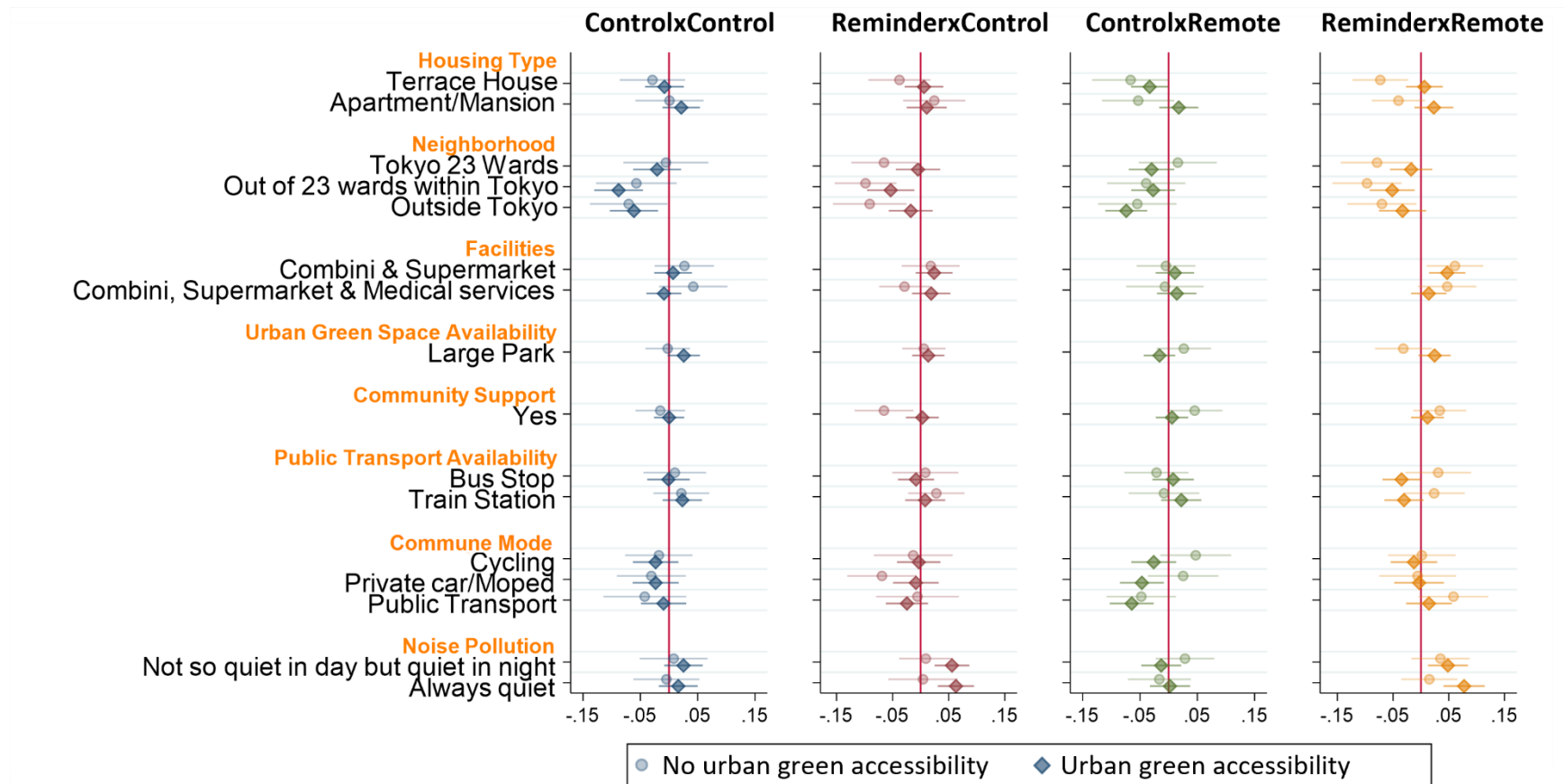
Supplementary Figure 1: Example of a Choice Set Experiment Presented to a Respondent (Translated).



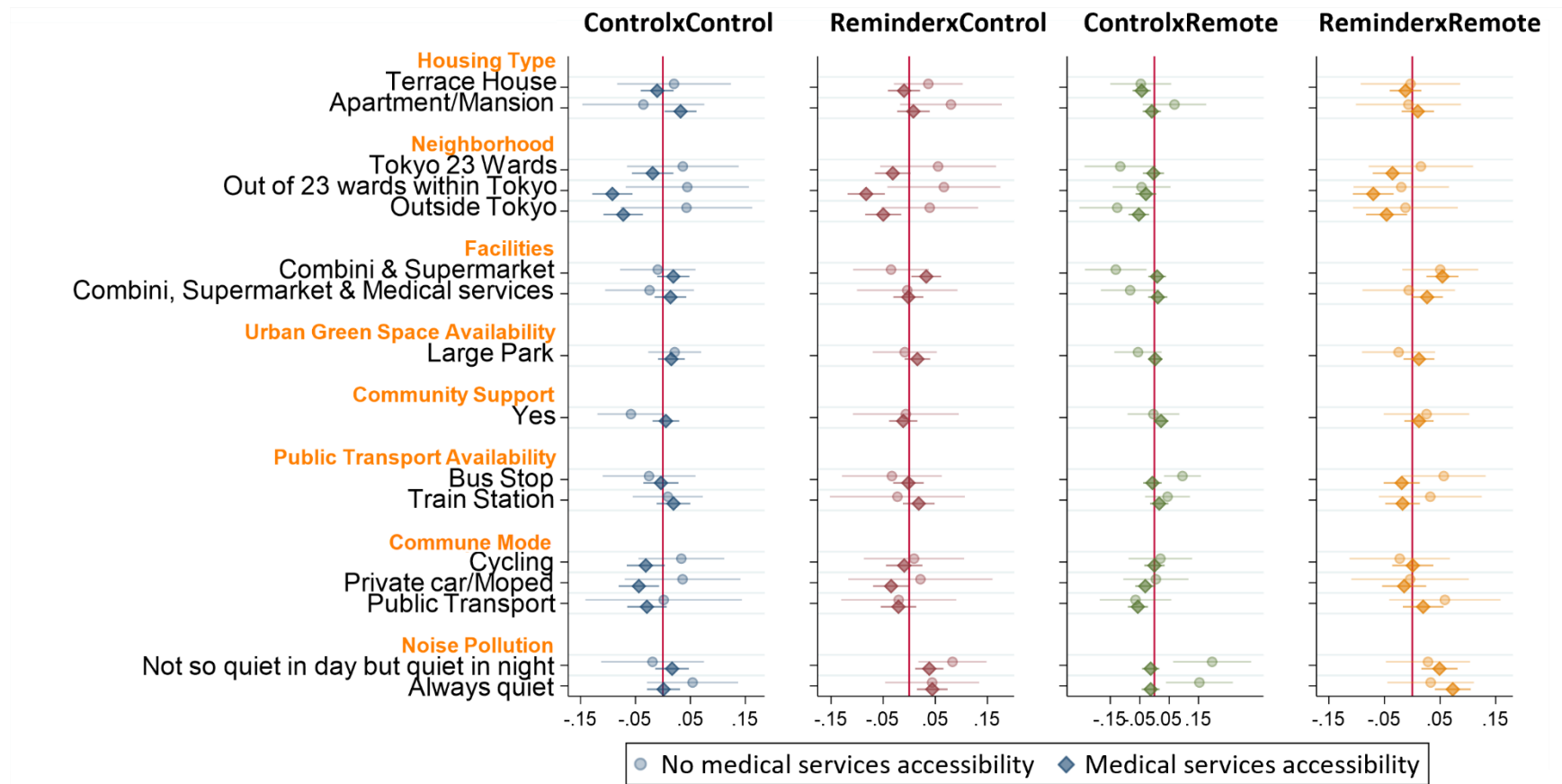
Supplementary Figure 2: Coefficient plot of AMCEs for RCT subgroups and tenancy of current residence. This plot visualized the heterogeneous effects of randomly assigned residence attribute values on the probability of being preferred as a residence in the coming five years by 4 groups of respondents [ControlxControl (blue), ControlxReminder (red), RemotexControl (green), and RemotexReminder (Orange)] which further divided by their tenancy of current residence: Non-owner (represented by round marker), and owner (represented by diamond marker). Markers represent the coefficients of the OLS with clustered standard errors by respondents. Lines represent 90% confidence intervals. Reference categories are excluded. Unbalanced covariates are included as control variables.



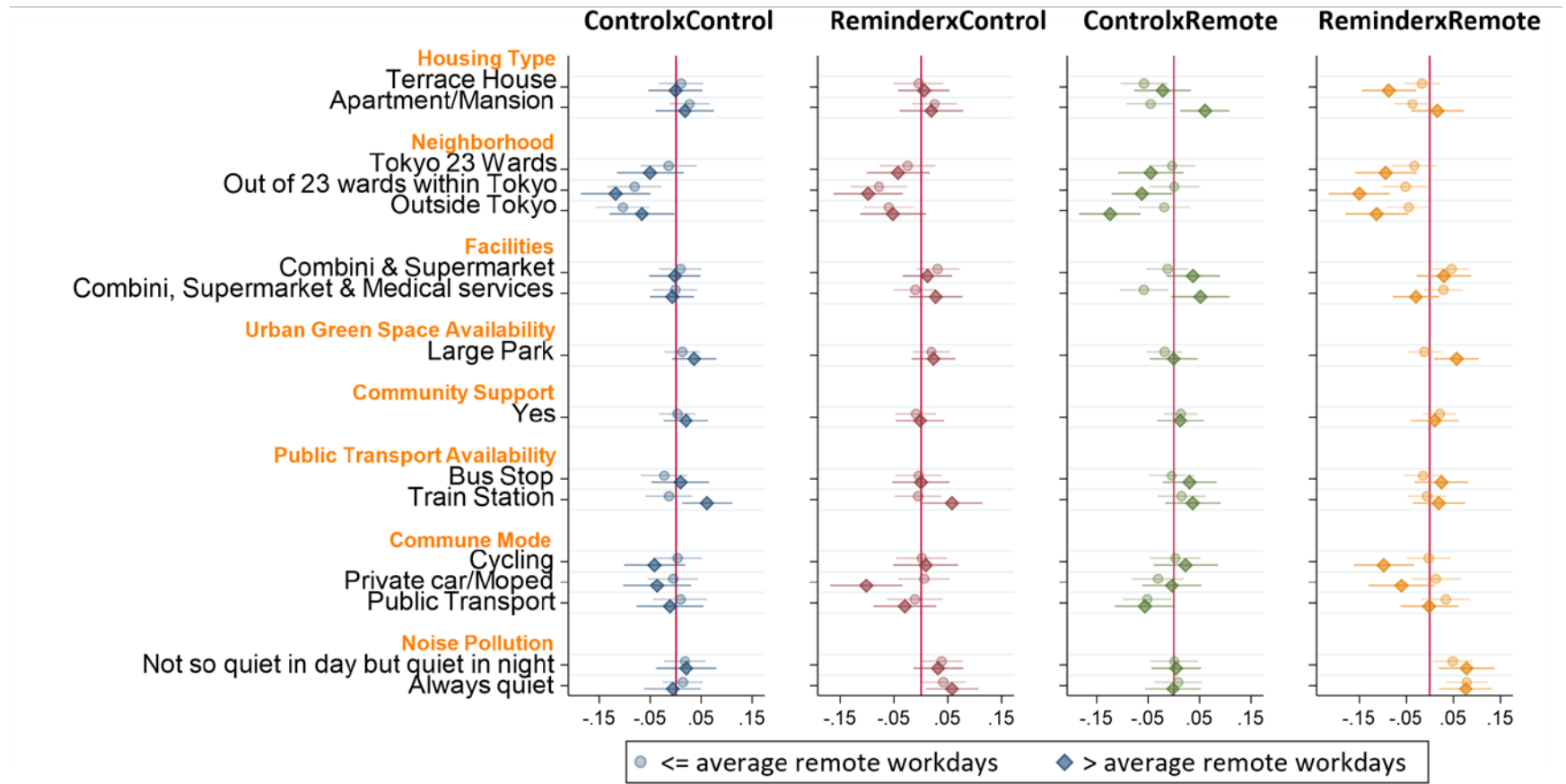
Supplementary Figure 3: Coefficient plot of AMCEs for RCT subgroups and household size. This plot visualized the heterogeneous effects of randomly assigned residence attribute values on the probability of being preferred as a residence in the coming five years by 4 groups of respondents [ControlxControl (blue), ControlxReminder (red), RemotexControl (green), and RemotexReminder (orange)] which further divided by their household size: 1-2 household members (represented by round marker), and >2 household members (represented by diamond marker). Markers represent the coefficients of the OLS with clustered standard errors by respondents. Lines represent 90% confidence intervals. Reference categories are excluded. Unbalanced covariates are included as control variables.



Supplementary Figure 4: Coefficient plot of AMCEs for RCT subgroups and urban green accessibility. This plot visualized the heterogeneous effects of randomly assigned residence attribute values on the probability of being preferred as a residence in the coming five years by 4 groups of respondents [ControlxControl (blue), ControlxReminder (red), RemotexControl (green), and RemotexReminder (Orange)] which further divided by their current resident's access to urban green within 15 minutes walking distance: not available (represented by round marker), and available (represented by diamond marker). Markers represent the coefficients of the OLS with clustered standard errors by respondents. Lines represent 90% confidence intervals. Reference categories are excluded. Unbalanced covariates are included as control variables.



Supplementary Figure 5: Coefficient plot of AMCEs for RCT subgroups and medical services accessibility. This plot visualized the heterogeneous effects of randomly assigned residence attribute values on the probability of being preferred as a residence in the coming five years by 4 groups of respondents [ControlxControl (blue), ControlxReminder (red), RemotexControl (green), and RemotexReminder (Orange)] which further divided by their current resident's access to medical services within 15 minutes walking distance: not available (represented by round marker), and available (represented by diamond marker). Markers represent the coefficients of the OLS with clustered standard errors by respondents. Lines represent 90% confidence intervals. Reference categories are excluded. Unbalanced covariates are included as control variables.



Supplementary Figure 6: Coefficient plot of AMCEs for RCT subgroups and above or below average remote workdays of their current job. This plot visualized the heterogeneous effects of randomly assigned residence attribute values on the probability of being preferred as a residence in the coming five years by 4 groups of respondents [ControlxControl (blue), ControlxReminder (red), RemotexControl (green), and RemotexReminder (Orange)] which further divided by more than average remote workdays of the current job: less or equal to average (represented by round marker), and more than average (represented by diamond marker). Markers represent the coefficients of the OLS with clustered standard errors by respondents. Lines represent 90% confidence intervals. Reference categories are excluded. Unbalanced covariates are included as control variables.