

A Supplemental Online Appendix

A.1 Detailed institutional background

This section provides information about the conditions of participation in the lottery and the draw in more detail. Lottery participants must hold an EEA citizenship and transfer the required application documents as well as the participation fees prior to a specific deadline ([Landesverwaltung Fürstentum Liechtenstein, 2009](#), section 38). The amount of the fee varies between the pre-draw (100 CHF) and the final draw (500 CHF) ([Ausländer- und Passamt, 2020](#)). Persons with an entry ban, posing a threat to public safety, or providing false statements are already excluded from the first draw of the lottery ([Landesverwaltung Fürstentum Liechtenstein, 2009](#), section 38, 3).

In the final draw, participants must be of full age and must not hold a permanent residence permit ([Ausländer- und Passamt, 2019b](#)). Importantly, they must also provide an employment contract of more than one year with a minimum activity level of 80% or an authorized permanent cross-border business activity in case of self-employment ([Ausländer- und Passamt, 2019b](#)). After winning both the pre-draw and the final draw, the lottery participant must relocate to Liechtenstein within six months, otherwise the residence permit expires ([Landesverwaltung Fürstentum Liechtenstein, 2009](#), section 37, 2). For this reason, our treatment is defined based on residing in Liechtenstein in the year after the lottery, as obtaining the permit is tied to actually moving there. The drawing procedure can be described as follows. All submitted applications (see [Figure A.1](#)) are put into a box and even include participants not fulfilling all conditions (to give them the chance to appeal against a later denial of a residence permit due to a violation of the conditions). In the presence of a national judge and media representatives, the winners of both draws are blindly drawn from the box and the person who draws announces the total number of winners as well as their nationality (see [Figure A.2](#)). Lottery losers of the final draw may participate again in subsequent lotteries, while multiple applications to the very same lottery are not allowed ([Landesverwaltung Fürstentum Liechtenstein, 2009](#), section 38, 1 c)).

Figure A.1: Participation voucher

Bitte hier Teilnahmecoupon abtrennen!

Antragsteller/in		Pflichtfelder sind mit * gekennzeichnet.	
Nachname *		Vorname *	
Geburtsdatum *	Geschlecht *	Staatsangehörigkeit *	
	<input type="checkbox"/> weiblich <input type="checkbox"/> männlich		
Strasse, Hausnummer *		Postleitzahl, Ort *	
Wohnland *			

Bewerbergruppen *
Bitte kreuzen Sie nur **eine** Bewerbergruppe an.

Erwerbstätige (Kennzahl: 103.431.00.07)
 Nicht Erwerbstätige (Kennzahl: 103.431.00.09)

Ich bestätige die Richtigkeit der Angaben und die Einzahlung der Gebühr von CHF 100.-

Unterschrift des Bewerbers/der Bewerberin *

(Bei der Unterschrift durch eine andere Person ist die Kopie einer Vollmacht erforderlich.)

Beachten Sie bitte die zweite Seite!

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Note: The figure presents the participation voucher (of 2019). Interested candidates fill out this form to participate in the pre-draw. The voucher stems from [Ausländer- und Passamt \(2019a\)](#).

Figure A.2: Final draw monitored by a judge



Note: The image shows exemplary the final draw of the spring lottery in 2016, which is monitored by a judge. The image comes from Michael Zanghellini, *Liechtensteiner Volksblatt*.

A.2 Additional information

Figure A.3: Map of Liechtenstein



Note: The figure presents the geographic position of Liechtenstein in Europe. The neighboring cantons in Switzerland are St. Gallen and Graubünden; the neighboring state in Austria is Vorarlberg. The image stems from Liechtenstein Marketing.

Table A.1: Descriptive statistics of outcomes: First participation from 2006 to 2016

	Residing (binary)		Employed (binary)		Activity level (%)		Years residing		Years employed		Observations
	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	
t = 2	0.13	0.34	0.55	0.50	51.94	48.75	0.13	0.34	0.55	0.50	3,145
t = 3	0.15	0.35	0.51	0.50	47.32	48.63	0.28	0.67	1.06	0.95	2,852
t = 4	0.15	0.36	0.47	0.50	43.19	48.18	0.43	0.99	1.52	1.39	2,607
t = 5	0.15	0.36	0.43	0.50	39.92	47.63	0.57	1.30	1.93	1.82	2,355
t = 6	0.14	0.35	0.40	0.49	36.53	46.79	0.70	1.60	2.30	2.23	2,145
t = 7	0.15	0.35	0.38	0.49	34.66	46.24	0.85	1.93	2.68	2.66	1,912
t = 8	0.14	0.35	0.36	0.48	32.20	45.48	0.98	2.21	2.99	3.06	1,621
t = 9	0.14	0.35	0.35	0.48	31.07	45.09	1.12	2.52	3.36	3.48	1,355
t = 10	0.14	0.35	0.34	0.47	30.06	44.51	1.23	2.80	3.69	3.86	1,072
t = 11	0.15	0.36	0.32	0.47	28.33	43.61	1.55	3.26	4.00	4.26	634
t = 12	0.18	0.38	0.34	0.48	29.57	43.93	2.02	3.83	4.58	4.75	311
Pooled	0.15	0.35	0.44	0.50	40.14	47.71	0.64	1.74	2.03	2.54	20,009

Note: The table presents the descriptive statistics of the outcome variables used in our analysis. The number of first lottery participants between 2006 and 2016 amounts to 3,145 observations in the second year after the lottery participation ($t = 2$) and decreases over time. Pooling all the outcome periods results in 20,009 observations. The outcomes are defined as follows: "Residing (binary)" indicates whether a person lives in Liechtenstein ($=1$) or not ($=0$). "Employed (binary)" informs about the employment status yes ($=1$) or no ($=0$) of a person in Liechtenstein. "Activity level (%)" measures the workload in per cent, whereby 0% denotes no employment and 100% represents a full time employment in Liechtenstein. "Years residing" or "Years employed" respectively, count the years of living or working in Liechtenstein. The instrument, winning the pre-draw, is measured in the year of the first lottery participation, which is the baseline period ($t = 0$). The treatment, moving to Liechtenstein, which is conditional on the possession of a residence permit, or not, is measured one year later ($t = 1$). The outcome periods start two years after the lottery ($t \geq 2$) and continue until the end of the data window for the respective observation, at most up to 12 years after the lottery participation. The period $t = 2$ is based on the lottery years 2006 to 2016, whereas $t = 12$ is only based on 2006. The data come from the employment statistics, calculations are our own.

Table A.2: Descriptive statistics for cross-border commuters: First participation from 2006 to 2016

	$Z = 1$		$Z = 0$		Mean difference	t -value	p -value	observations
	Mean	Std. dev	Mean	Std. dev				
Female	0.28	0.45	0.29	0.45	-0.01	-0.25	0.81	1,615
<i>Nationality</i>								
Austria	0.45	0.50	0.44	0.50	0.01	0.24	0.81	1,615
Germany	0.36	0.48	0.36	0.48	0.00	0.13	0.90	1,615
Italy	0.05	0.21	0.08	0.26	-0.03	-1.70	0.09	1,615
Switzerland	0.02	0.12	0.01	0.07	0.01	1.08	0.28	1,615
Others	0.12	0.33	0.12	0.32	0.00	0.19	0.85	1,615
Age	36.40	9.11	35.35	8.99	1.05	1.50	0.13	1,615
<i>First lottery participation</i>								
Dummy 2006	0.08	0.28	0.09	0.28	-0.00	-0.17	0.87	1,615
Dummy 2007	0.08	0.27	0.09	0.29	-0.02	-0.79	0.43	1,615
Dummy 2008	0.10	0.30	0.13	0.34	-0.04	-1.50	0.13	1,615
Dummy 2009	0.10	0.31	0.09	0.28	0.02	0.74	0.46	1,615
Dummy 2010	0.06	0.24	0.09	0.29	-0.03	-1.43	0.15	1,615
Dummy 2011	0.09	0.29	0.09	0.29	0.00	0.02	0.98	1,615
Dummy 2012	0.08	0.28	0.08	0.27	0.01	0.30	0.77	1,615
Dummy 2013	0.09	0.29	0.08	0.27	0.01	0.59	0.56	1,615
Dummy 2014	0.13	0.34	0.09	0.29	0.04	1.52	0.13	1,615
Dummy 2015	0.08	0.28	0.07	0.26	0.01	0.43	0.67	1,615
Dummy 2016	0.09	0.29	0.10	0.29	-0.00	-0.11	0.92	1,615
Number of observations	193		1,422					

Note: The table presents the descriptive statistics of the covariates used in the analysis for the subgroup of cross-border commuters. The number of first lottery participants between 2006 and 2016 amounts to 1,615 observations. We report the statistics separately for pre-draw winners ($Z = 1$) and pre-draw losers ($Z = 0$) in the year prior to the lottery.

Table A.3: Descriptive statistics for non-commuters: First participation from 2006 to 2016

	$Z = 1$		$Z = 0$		Mean difference	t -value	p -value	observations
	Mean	Std. dev	Mean	Std. dev				
Female	0.29	0.46	0.31	0.46	-0.02	-0.43	0.67	1,530
<i>Nationality</i>								
Missing Dummy	0.00	0.00	0.03	0.18	-0.03	-6.82	0.00	1,530
Austria	0.29	0.45	0.29	0.45	0.00	0.03	0.97	1,485
Germany	0.43	0.50	0.48	0.50	-0.05	-1.21	0.23	1,485
Italy	0.08	0.27	0.07	0.25	0.01	0.35	0.72	1,485
Switzerland	0.00	0.00	0.01	0.08	-0.01	-2.83	0.00	1,485
Others	0.20	0.40	0.16	0.36	0.05	1.42	0.16	1,485
<i>Age</i>								
Missing Dummy	0.02	0.14	0.05	0.21	-0.03	-2.22	0.03	1,530
Age	36.06	9.46	37.74	10.12	-1.67	-2.06	0.04	1,463
<i>First lottery participation</i>								
Dummy 2006	0.11	0.31	0.11	0.32	-0.00	-0.17	0.86	1,530
Dummy 2007	0.11	0.32	0.11	0.32	0.00	0.04	0.97	1,530
Dummy 2008	0.09	0.29	0.16	0.36	-0.07	-2.71	0.01	1,530
Dummy 2009	0.10	0.30	0.09	0.29	0.01	0.45	0.65	1,530
Dummy 2010	0.06	0.24	0.09	0.28	-0.02	-1.02	0.31	1,530
Dummy 2011	0.12	0.33	0.09	0.28	0.03	1.18	0.24	1,530
Dummy 2012	0.10	0.29	0.07	0.25	0.03	1.13	0.26	1,530
Dummy 2013	0.07	0.26	0.05	0.22	0.02	1.00	0.32	1,530
Dummy 2014	0.07	0.26	0.06	0.24	0.01	0.31	0.76	1,530
Dummy 2015	0.10	0.29	0.08	0.27	0.02	0.65	0.51	1,530
Dummy 2016	0.07	0.26	0.09	0.29	-0.02	-1.06	0.29	1,530
Number of observations	157		1,373					

Note: The table presents the descriptive statistics of the covariates used in the analysis for the subgroup of non-commuters. The number of first lottery participants between 2006 and 2016 amounts to 1,530 observations. We report the statistics separately for pre-draw winners ($Z = 1$) and pre-draw losers ($Z = 0$) in the year prior to the lottery.

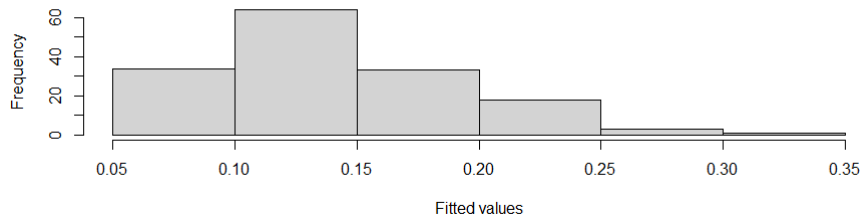
A.3 Further analyses and robustness checks

Table A.4: Empirical results based on first participation and further covariates

First-stage					
Effect	0.35				
Standard error	0.03				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.25	0.07	5.93	1.20	0.35
Standard error	0.03	0.03	2.91	0.15	0.15
<i>P</i> -value	0.00	0.02	0.04	0.00	0.02
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.70	0.21	16.87	3.41	0.99
Standard error	0.06	0.08	7.71	0.27	0.39
<i>P</i> -value	0.00	0.01	0.03	0.00	0.01
Number of observations	20,009				
Trimmed observations	388				

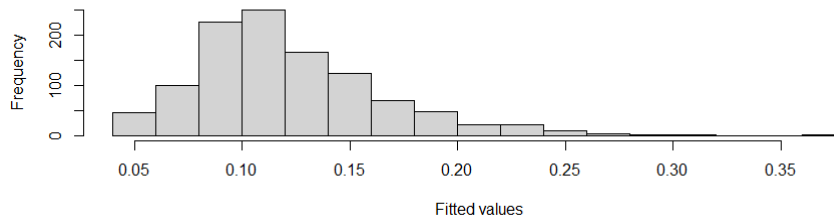
Note: The table presents the empirical results based on the first lottery participation and controls for the following covariates: Female, nationality, age and year of the first lottery. Only observations whose first lottery participation was between 2006 and 2016 are included. The number of observations differs from the number of lottery applicants in Table 3 because several outcome periods of each lottery participant are pooled in this table. The standard errors are estimated by cluster bootstrapping.

Figure A.4: Propensity score for the subgroup of pre-draw winners in their second participation



Note: The figure presents the propensity score for the subgroup of pre-draw winners in their second participation.

Figure A.5: Propensity score for the subgroup of pre-draw losers in their second participation



Note: The figure presents the propensity score for the subgroup of pre-draw losers in their second participation.

Table A.5: Empirical results based on second participation and year dummies

First-stage					
Effect	0.40				
Standard error	0.07				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.31	0.12	10.84	1.28	0.51
Standard error	0.06	0.06	5.13	0.29	0.26
<i>P</i> -value	0.00	0.03	0.03	0.00	0.05
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.78	0.31	27.39	3.24	1.29
Standard error	0.12	0.15	13.91	0.53	0.72
<i>P</i> -value	0.00	0.04	0.05	0.00	0.07
Number of observations	6,771				
Trimmed observations	1,251				

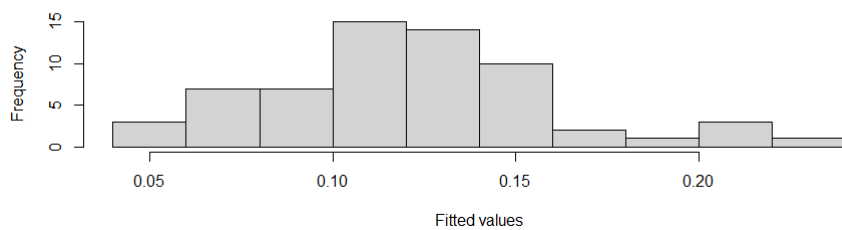
Note: The table presents the empirical results based on the second lottery participation and controls for year dummies. Only observations whose first lottery participation was between 2006 and 2016 are included. The standard errors are estimated by cluster bootstrapping.

Table A.6: Empirical results based on second participation and further covariates

First-stage					
Effect	0.37				
Standard error	0.06				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.26	0.09	9.47	1.07	0.34
Standard error	0.06	0.05	4.89	0.26	0.23
<i>P</i> -value	0.00	0.09	0.05	0.00	0.14
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.70	0.24	25.26	2.86	0.92
Standard error	0.11	0.14	13.16	0.48	0.64
<i>P</i> -value	0.00	0.09	0.05	0.00	0.15
Number of observations	6,771				
Trimmed observations	1,726				

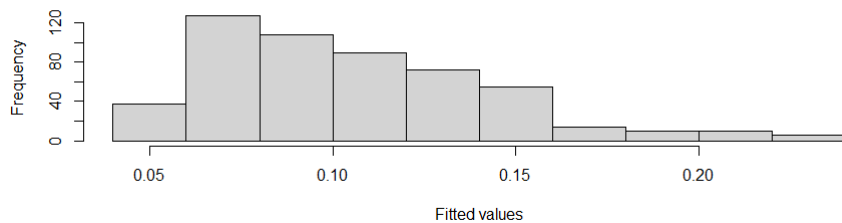
Note: The table presents the empirical results based on the second lottery participation and controls for the following covariates: Female, nationality, age and year of the first lottery. Only observations whose first lottery participation was between 2006 and 2016 are included. The standard errors are estimated by cluster bootstrapping.

Figure A.6: Propensity score for the subgroup of pre-draw winners in their third participation



Note: The figure presents the propensity score for the subgroup of pre-draw winners in their third participation.

Figure A.7: Propensity score for the subgroup of pre-draw losers in their third participation



Note: The figure presents the propensity score for the subgroup of pre-draw losers in their third participation.

Table A.7: Empirical results based on third participation and year dummies

First-stage					
Effect	0.61				
Standard error	0.10				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.47	0.13	9.21	1.81	0.53
Standard error	0.10	0.09	8.26	0.53	0.39
<i>P</i> -value	0.00	0.16	0.27	0.00	0.17
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.77	0.22	15.19	2.99	0.88
Standard error	0.17	0.18	16.16	0.89	0.82
<i>P</i> -value	0.00	0.22	0.35	0.00	0.28
Number of observations	3,369				
Trimmed observations	1,088				

Note: The table presents the empirical results based on the third lottery participation and controls for year dummies. Only observations whose first lottery participation was between 2006 and 2016 are included. The standard errors are estimated by cluster bootstrapping.

Table A.8: Empirical results based on third participation and further covariates

First-stage					
Effect	0.48				
Standard error	0.11				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.41	0.13	8.55	1.82	0.63
Standard error	0.10	0.10	9.24	0.50	0.45
<i>P</i> -value	0.00	0.18	0.35	0.00	0.16
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.85	0.28	17.91	3.80	1.32
Standard error	0.20	0.21	18.69	0.95	1.01
<i>P</i> -value	0.00	0.18	0.34	0.00	0.19
Number of observations	3,369				
Trimmed observations	1,192				

Note: The table presents the empirical results based on the third lottery participation and and controls for the following covariates: Female, nationality, age and year of the first lottery. Only observations whose first lottery participation was between 2006 and 2016 are included. The standard errors are estimated by cluster bootstrapping.

Table A.9: Effects among Austrians

First-stage					
Effect	0.35				
Standard error	0.05				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.26	0.06	4.52	1.30	0.30
Standard error	0.05	0.05	4.49	0.24	0.24
<i>P</i> -value	0.00	0.22	0.31	0.00	0.20
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.75	0.17	12.95	3.71	0.87
Standard error	0.08	0.13	12.54	0.41	0.65
<i>P</i> -value	0.00	0.20	0.30	0.00	0.18
Number of observations	7,326				
Trimmed observations	0				

Note: The table presents the empirical results for the subgroup of Austrians (one year prior to the lottery). As in Table 4, the analysis is based on the first lottery participation and controls for year dummies. Only observations whose first lottery participation was between 2006 and 2016 are included. The number of observations differs from the number of lottery applicants in Table 3 because several outcome periods of each lottery participant are pooled in this table. The standard errors are estimated by cluster bootstrapping.

Table A.10: Effects among Non-Austrians

First-stage					
Effect	0.36				
Standard error	0.04				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.24	0.08	6.34	1.15	0.34
Standard error	0.04	0.04	3.90	0.20	0.21
<i>P</i> -value	0.00	0.05	0.10	0.00	0.10
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.66	0.22	17.59	3.19	0.95
Standard error	0.08	0.10	10.06	0.38	0.53
<i>P</i> -value	0.00	0.03	0.08	0.00	0.07
Number of observations	12,375				
Trimmed observations	0				

Note: The table presents the empirical results for the subgroup of Non-Austrians (one year prior to the lottery). As in Table 4, the analysis is based on the first lottery participation and controls for year dummies. Only observations whose first lottery participation was between 2006 and 2016 are included. The number of observations differs from the number of lottery applicants in Table 3 because several outcome periods of each lottery participant are pooled in this table. The standard errors are estimated by cluster bootstrapping.

Table A.11: Effects among workers ≥ 38 years

First-stage					
Effect	0.28				
Standard error	0.05				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.23	0.12	8.16	1.18	0.60
Standard error	0.05	0.05	4.45	0.26	0.24
<i>P</i> -value	0.00	0.01	0.07	0.00	0.01
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.83	0.44	29.29	4.23	2.15
Standard error	0.10	0.16	14.73	0.59	0.79
<i>P</i> -value	0.00	0.01	0.05	0.00	0.01
Number of observations	8,186				
Trimmed observations	0				

Note: The table presents the empirical results for the subgroup of workers equal to or older than 38 years (one year prior to the lottery). As in Table 4, the analysis is based on the first lottery participation and controls for year dummies. Only observations whose first lottery participation was between 2006 and 2016 are included. The number of observations differs from the number of lottery applicants in Table 3 because several outcome periods of each lottery participant are pooled in this table. The standard errors are estimated by cluster bootstrapping.

Table A.12: Effects among workers ≤ 37 years

First-stage					
Effect	0.42				
Standard error	0.04				
<i>P</i> -value	0.00				
ITT					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.28	0.06	6.59	1.34	0.31
Standard error	0.04	0.04	3.87	0.20	0.20
<i>P</i> -value	0.00	0.11	0.09	0.00	0.12
LATE					
Outcomes	Residing (binary)	Employed (binary)	Activity level (%)	Years residing	Years employed
Effect	0.66	0.15	15.51	3.15	0.72
Standard error	0.07	0.09	8.74	0.34	0.44
<i>P</i> -value	0.00	0.09	0.08	0.00	0.10
Number of observations	11,409				
Trimmed observations	0				

Note: The table presents the empirical results for the subgroup of workers equal to or older than 37 years (one year prior to the lottery). As in Table 4, the analysis is based on the first lottery participation and controls for year dummies. Only observations whose first lottery participation was between 2006 and 2016 are included. The number of observations differs from the number of lottery applicants in Table 3 because several outcome periods of each lottery participant are pooled in this table. The standard errors are estimated by cluster bootstrapping.