“The Effect of Wealth on Individual and Household Labor Supply: Evidence from Swedish Lotteries”

Online Appendix

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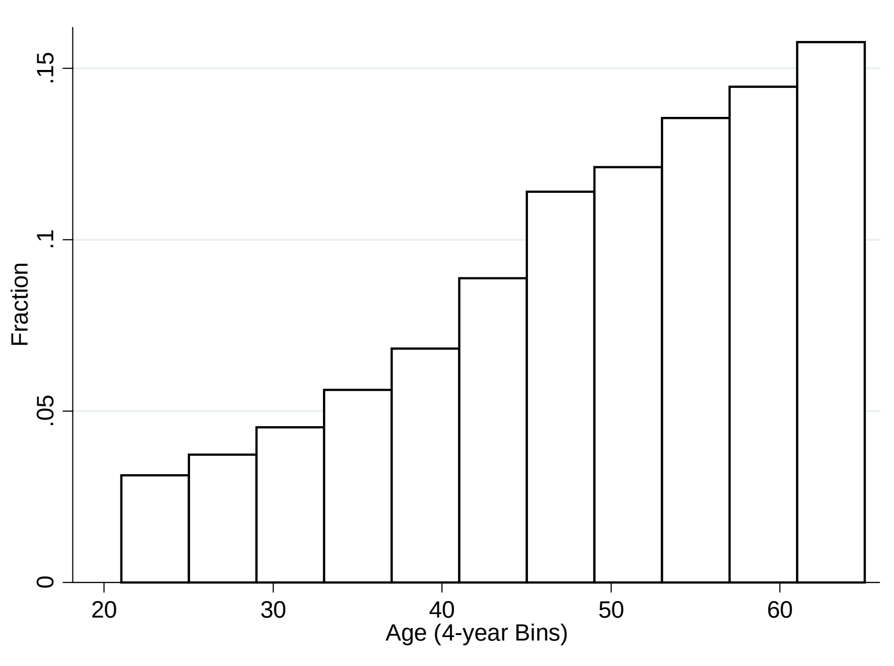
1. Introduction

This document contains tables and figures referenced in the main text and additional information about various aspects of our analyses, including model simulation methodology, relevant institutional details, construction of outcome variables and additional robustness analyses. For a detailed description of how the lottery data were processed and quality controlled, see sections III–VI of Cesarini et al. (2015).

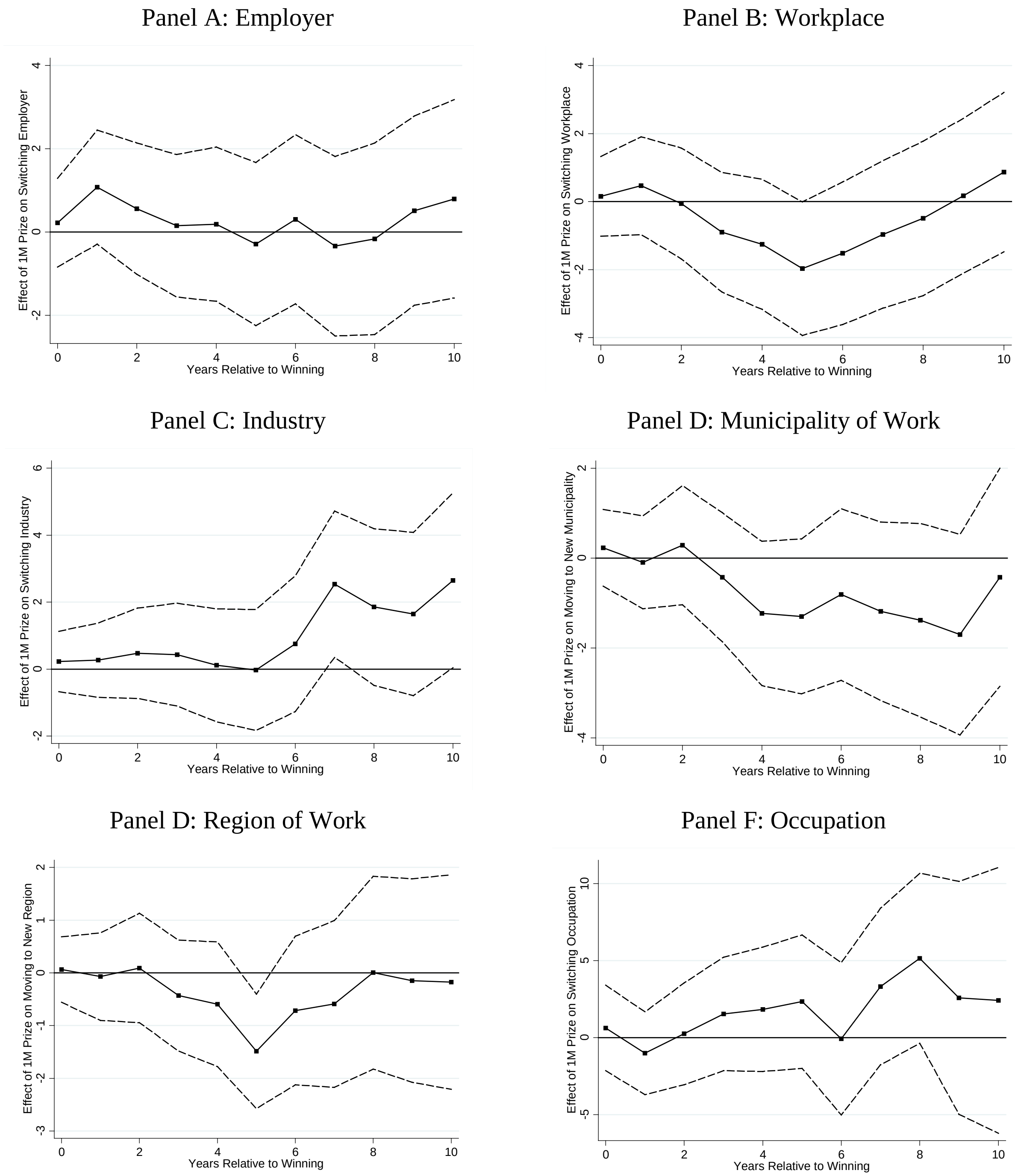
2. Appendix Figures

Figure A2.1: Age Distribution



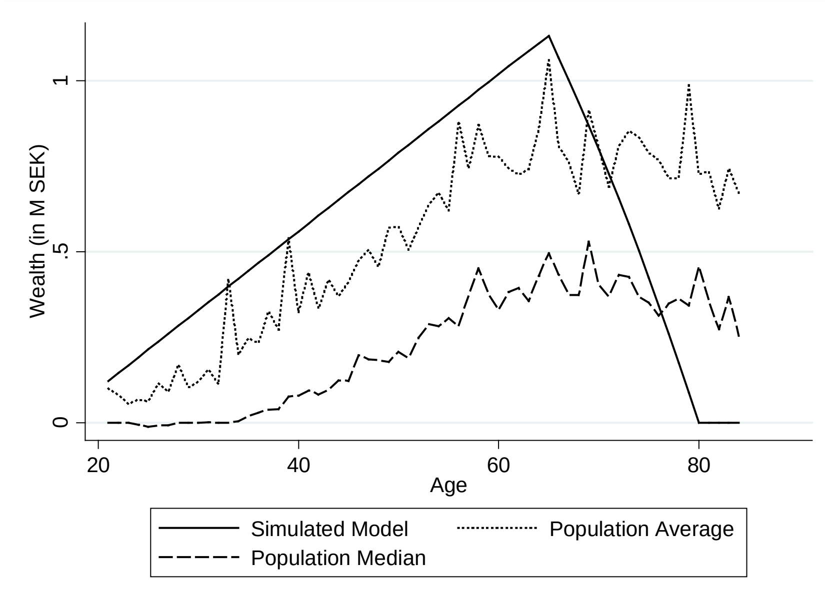
Notes: This figure reports the age distribution at the time of win for the pooled lottery sample.

Figure A2.2: Effect of Lottery Wealth on Probability of Switching Employer, Workplace, Industry, Municipality, Region of Work, or Occupation.



Notes: This figure reports estimates of equation (2) obtained from our pooled lottery sample. The dependent variable is an indicator equal to 1 if the player's employer (Panel A), workplace (Panel B), etc., in year *t* differed from the year before the lottery. Each year is thus a separate regression.

Figure A2.3: Asset Accumulation in Representative Sample and Simulated Model

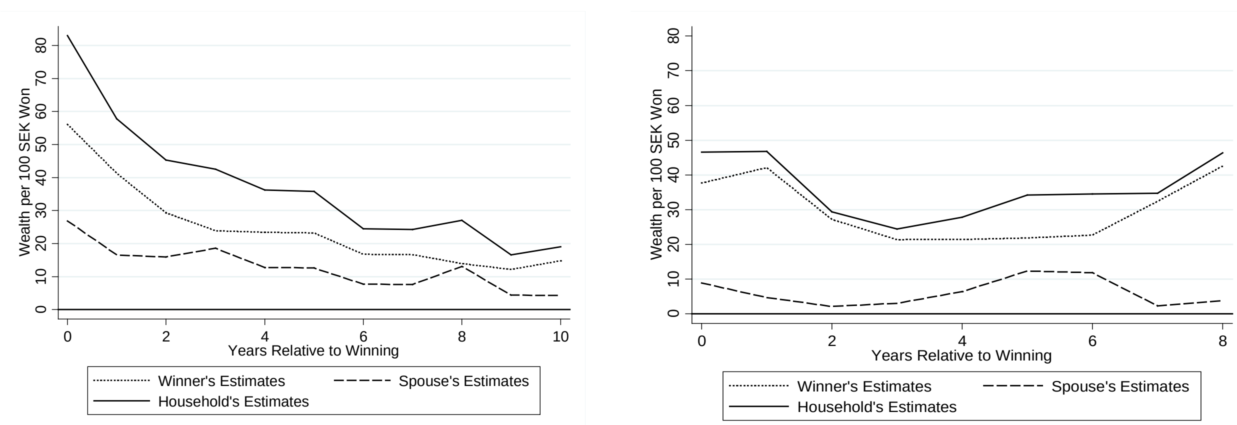


Notes: The figure shows the average and median registered net wealth in year 2000 by age for a representative sample of the Swedish population together with the simulated path for a 20-year-old non-winner using the parameter estimates reported in Table 5.

Figure A2.4: Effect of Lottery Wealth on Household Wealth

Panel A: Triss-Lumpsum Lottery

Panel B: Kombi Lottery



Notes: This figure reports estimates of equation (2) for married winners and their spouses with registered net wealth as the dependent variable. Panel A reports the estimates for the Triss-Lumpsum lottery and Panel B for the Kombi lottery.

3. Appendix Tables

Table A3.1. Identification across the Various Lottery Samples

	Time Period	Treatment Variable	Cells/Fixed Effects	Multiple Winners
PLS Fixed-prize Lottery	1986-2003	Prize	Prize Draw × # Prizes	Included
PLS Odds-prize Lottery	1986-1994	Prize	Prize Draw × Balance	Included
Kombi Lottery	1998-2010	Prize	Prize Draw × Balance	Included
Triss-Lumpsum	1994-2010	Prize	Year × Prize Plan	Excluded
Triss-Monthly	1997-2010	NPV of prize	Year × Prize Plan	Excluded

Notes: This table shows how we construct cells within which prizes are randomly assigned for the different lotteries. PLS odds prizes are only included for winners that win a single prize in a draw, and odds prizes below 100,000 SEK are excluded. NPV is net present value assuming an annual discount rate of 2%.

Table A3.2. Similarity of Adult Lottery Winners to the General Population

	Pooled Lottery Sample		Individual Lottery Samples			
			PLS	Kombi	Triss-Lumpsum	Triss-Monthly
Birthyear	1945.6		1944.9	1949.9	1956.3	1958.4
Female	0.491		0.506	0.363	0.496	0.478
Nordic Born	0.966		0.965	0.981	0.929	0.930
College	0.244		0.249	0.206	0.206	0.228
Married	0.592		0.598	0.551	0.498	0.478
Labor income	212,524		208,083	250,502	214,073	242,464
Post-tax income	146,987		141,231	194,121	163,959	178,620
Post-tax income (including SSC)	181,935		175,243	236,981	199,997	216,666
SD of Labor Income	137,816		134,730	156,240	143,665	152,537
Labor income > 25K	0.888		0.891	0.865	0.867	0.891
Spousal Labor Income	202,980		201,535	213,951	220,907	242,332
N	251,748		222,476	25,435	3,268	569
	Unweighted Random Population Samples		Random Population Samples: Sex and Age Reweighted to Distribution of Above Lottery			
	1990	2000	1990	2000	2000	2000
Birthyear	1949.1	1957.8	1944.9	1949.9	1956.3	1958.4
Female	0.493	0.499	0.506	0.363	0.496	0.478
Nordic Born	0.933	0.900	0.937	0.913	0.904	0.902
College	0.166	0.283	0.209	0.285	0.297	0.318
Married	0.533	0.455	0.590	0.577	0.491	0.475
Labor income	189,778	198,277	184,060	237,962	212,794	229,510
Post-tax income	112,896	141,090	130,288	184,381	161,557	172,874
Post-tax income (including SSC)	142,084	178,390	161,487	223,591	196,265	209,000
SD of Labor Income	116,853	151,765	132,429	185,233	163,983	172,074
Labor income > 25K	0.897	0.823	0.836	0.805	0.826	0.831
Spousal Labor Income	203,264	225,214	191,462	223,675	226,304	244,850

Notes: This table compares characteristics of lottery players to those of the general population. The first column in the upper panel reports summary statistics for the pooled lottery sample, and the four other columns display descriptive statistics by lottery. Each lottery sample is compared to representative samples of Swedes drawn randomly from the year-end Swedish population in 1990 or 2000. For PLS, we reweight the 1990 representative sample so that its age and sex distribution exactly matches that of the PLS sample. For the remaining three lotteries, we proceed analogously except that we use the 2000 representative sample. We measure the covariates of the successfully matched members of the representative sample the year before the winner to whom they were matched won the prize. The earnings measures include income variables measured prior to 1991 (which are not used as outcome variables in our analysis).

Table A3.3. Tests of Conditional Randomization Assignment

	Pooled Sample		Individual Lottery Samples			
			PLS	Kombi	Triss-Lumpsum	Triss-Monthly
	(1)	(2)	(3)	(4)	(5)	(6)
Omnibus *p*	0.000	0.310	0.903	0.756	0.299	0.885
Baseline Controls						
Female	13.265	3.177	0.402	14.323	10.177	1064.408
	(8.600)	(6.103)	(3.279)	(42.926)	(277.023)	(1343.800)
	[0.123]	[0.603]	[0.902]	[0.739]	[0.971]	[0.429]
Age	29.413	16.847	4.704	-192.682	500.756	684.273
	(17.506)	(12.095)	(5.894)	(306.829)	(512.238)	(2210.824)
	[0.093]	[0.164]	[0.425]	[0.530]	[0.328]	[0.757]
Age^2	-0.809	-0.389	-0.119	2.573	-12.282	-10.084
	(0.407)	(0.284)	(0.139)	(6.109)	(12.464)	(52.689)
	[0.047]	[0.170]	[0.393]	[0.674]	[0.325]	[0.848]
Age^3	0.007	0.003	0.001	-0.010	0.100	0.039
	(0.003)	(0.002)	(0.001)	(0.040)	(0.097)	(0.402)
	[0.031]	[0.171]	[0.381]	[0.813]	[0.304]	[0.923]
Nordic Born	-96.604	10.504	3.336	-10.271	152.309	892.431
	(27.853)	(18.118)	(7.337)	(70.511)	(547.635)	(2121.693)
	[0.001]	[0.562]	[0.649]	[0.884]	[0.781]	[0.674]
College-Graduate	-37.187	4.137	-1.798	-16.374	555.951	113.251
	(9.950)	(6.855)	(3.804)	(17.131)	(361.183)	(1586.134)
	[<0.001]	[0.546]	[0.637]	[0.339]	[0.124]	[0.943]
Labor Income in Previous Year (in 1000 SEK)	0.137	-0.016	-0.006	-0.010	-1.115	1.450
	(0.039)	(0.024)	(0.012)	(0.048)	(1.022)	(5.458)
	[<0.001]	[0.509]	[0.596]	[0.834]	[0.275]	[0.791]
R^2	0.000	0.534	0.084	0.086	0.008	0.12
Cell FEs	No	Yes	Yes	Yes	Yes	Yes
N	251,748	251,748	222,476	25,435	3,268	569

Notes: This table reports results from tests for random assignment of lottery prizes. The omnibus p-value is from the test of the joint significance of all variables. Column (1) shows the specification that excludes controls for the cell fixed effects, and the remaining columns show the p-value when cell fixed effects are included. Standard errors are clustered by individual.

Table A3.4. Lottery Prizes and Individual-level Labor Earnings: Nonlinear Responses

	Quadratic model	Spline regression with knot at 1M		Excluding prizes…		
		< 1M	> 1M	> 5M	> 2M	> 1M
	(1)	(2)	(3)	(4)	(5)	(6)
Prize Amount (SEK/100)	-1.188	-1.448	0.569	-1.161	-1.324	-1.308
SE	(0.255)	(0.295)	(0.450)	(0.166)	(0.212)	(0.636)
p	[<0.001]	[<0.001]	[0.205]	[<0.001]	[<0.001]	[0.040]
Prize Amount $(SEK/1000)^2$	0.0003					
SE	(0.001)					
p	[0.640]					
N	249,278	249,278		249,184	248,770	247,872

Notes: This table reports event-study estimates designed to investiagte whether evidence of non-linear effects exists. Column (1) reports the resulting estimates when a quadratic term is included in the estimating equation (1). Columns (2)-(3) report the results from a spline regression with a knot at 1M SEK. Columns (4)-(6) show the resulting estimates when prizes above 5M, 2M, and 1M SEK are excluded from the sample. The prize amount is scaled so that a coefficient of 1.00 implies a 1 SEK increase in earnings per 100 SEK won.

Table A3.5. Lottery Prizes and Individual-level Labor Earnings: Heterogeneity

	Lottery				Sex	
	PLS	Kombi	Triss-Lumpsum	Triss-Monthly	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Prize Amount (SEK/100)	-1.208	-1.497	-0.942	-1.027	-1.350	-0.798
SE	(0.225)	(0.452)	(0.232)	(0.339)	(0.240)	(0.169)
p	[<0.001]	[<0.001]	[<0.001]	[0.002]	[<0.001]	[<0.001]
p -value equal effects		[0.680]			[0.060]	
N	221,565	24,161	3,033	519	126,654	122,624

	Age at Time of Win			Education	
	21-34	35-54	55-64	College	No college
	(7)	(8)	(9)	(10)	(11)
Prize Amount (SEK/100)	-1.174	-1.104	-1.069	-1.352	-0.953
SE	(0.309)	(0.223)	(0.258)	(0.344)	(0.162)
p	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
p -value equal effects		[0.966]		[0.297]	
N	35,426	121,797	92,055	62,371	186,907

	Pre-win Earnings Tertiles: Pre-tax Labor Earnings			Pre-win Earnings Tertiles: Post-tax Earnings		
	Low	Medium	High	Low	Medium	High
	(12)	(13)	(14)	(15)	(16)	(17)
Prize Amount (SEK/100)	-0.8062	-0.8683	-1.6701	-0.5651	-0.4215	-0.7797
SE	-0.158	0.1688	0.3952	-0.1081	0.0979	0.2023
p	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
p -value equal effects		[0.123]			[0.242]	
N	82,105	84,873	82,300	83,087	84,316	81,875

Notes: This table reports event-study estimates obtained by estimating equation (2) in various subsamples. The prize amount is scaled so that a coefficient of 1.00 implies a 1 SEK increase in earnings per 100 SEK won. The table also reports the *p* -value is from an *F* -test of equal effects in the different subsamples.

Table A3.6. Lottery Prizes and Household Net Wealth/Capital income

Panel A: Net Wealth in Triss-Lumpsum (Year of Winning)

	Winner (1)	Spouse (2)	Difference (3)	Household (4)	Spousal share (5)
Prize Amount (SEK/100)	55.956	26.423	29.482	82.294	32.1%
SE	-6.136	-5.583	-7.873	-8.705	
p	[<0.001]	[<0.001]	[<0.001]	[<0.001]	
N	726	726	726	726	

Panel B: Net Wealth in the Kombi Lottery (Year of Winning)

	Winner (6)	Spouse (7)	Difference (8)	Household (9)	Spousal share (10)
Prize Amount (SEK/100)	37.753	8.345	28.270	46.284	18.0%
SE	-7.394	-6.185	-9.433	-9.680	
p	[<0.001]	[0.177]	[0.003]	[<0.001]	
N	10,028	10,028	10,028	10,028	

Panel C: Capital income in the PLS Lottery (Year after Winning)

	Winner (11)	Spouse (12)	Difference (13)	Household (14)	Spousal share (15)
Prize Amount (SEK/100)	2.716	0.468	2.254	3.193	14.7%
SE	-0.147	-0.105	-0.172	-0.188	
p	[<0.001]	[<0.001]	[<0.001]	[<0.001]	
N	130,930	130,393	129,857	129,857	

Notes: This table reports results of estimating equation (2) separately for winners, winners' spouses, and at the household level for each lottery. The dependent variable is registered net wealth for the Triss and Kombi lotteries (Panel A and B). Because wealth is only measured between 1999 and 2007, we have too few PLS winners to obtain meaningful estimates. Panel C therefore shows the effect on capital income instead. The prize amount is scaled so that a coefficient of 1.00 implies a 1 SEK increase in wealth or income per 100 SEK won. All regressions include baseline controls for both winners and their spouses.

Table A3.7. Lottery Prizes and Household Labor Earnings: PLS and Kombi Samples

Panel A: Pre-tax Labor Earnings

	Winner (1)	Spouse (2)	Difference (3)	Household (4)
Prize Amount (SEK/100)	-1.140	-0.355	-0.785	-1.495
SE	(0.273)	(0.317)	(0.412)	(0.424)
p	[<0.001]	[0.262]	[0.057]	[<0.001]
N	129,714	129,714	129,714	129,714
# PLS/Kombi lottery tickets	170.3/1.48	48.0/0.09		

Panel B: Pre-tax Labor Earnings (Both Spouses below Age 59)

	Winner (5)	Spouse (6)	Difference (7)	Household (8)
Prize Amount (SEK/100)	-0.993	-0.108	-0.885	-1.101
SE	(0.290)	(0.342)	(0.449)	(0.448)
p	[<0.001]	[0.752]	[0.049]	[0.014]
N	98,804	98,804	98,804	98,804

Panel C: Post-tax Earnings

	Winner (9)	Spouse (10)	Difference (11)	Household (12)
Prize Amount (SEK/100)	-0.552	-0.206	-0.346	-0.759
SE	(0.117)	(0.146)	(0.175)	(0.200)
p	[<0.001]	[0.159]	[0.048]	[<0.001]
N	128,902	128,902	128,902	128,902

Panel D: Pre-tax Labor Earnings (Both Spouses Previously Played the Lottery)

	Winner (13)	Spouse (14)	Difference (15)	Household (16)
Prize Amount (SEK/100)	-1.435	-0.201	-1.234	-1.636
SE	(0.426)	(0.431)	(0.576)	(0.634)
p	[<0.001]	[0.641]	[0.032]	[0.010]
N	77,115	77,115	77,115	77,115
# PLS/Kombi lottery tickets	165.5/1.52	74.6/0.90		

Panel E: Pre-tax Labor Earnings (Both Spouses Played in Same Lottery Draw)

	Winner (17)	Spouse (18)	Difference (19)	Household (20)
Prize Amount (SEK/100)	-1.741	-0.375	-1.366	-2.116
SE	(0.447)	(0.456)	(0.609)	(0.667)
p	[<0.001]	[0.411]	[0.025]	[0.002]
N	50,320	50,320	50,320	50,320
# PLS/Kombi lottery tickets	165.5/1.54	114.5/1.26		

Notes: This table reports event-study estimates obtained by estimating equation (2) on winners, winners' spouses, and at the hosehold level for different subsamples of PLS and Kombi. Panel A and C include all married PLS and Kombi winners and show results for pre-tax labor earnings and post-tax earnings, respectively. Panel B includes only couples below age 59 at the time of the lottery event. Panel D restricts the sample to households in which both spouses played the same lottery prior to the lottery event, and Panel E restricts the samples to couples in which both spouses participated in the same lottery draw as the lottery event. The prize amount is scaled so that a coefficient of 1.00 implies a 1 SEK increase in earnings per 100 SEK won. All regressions include baseline controls for both winners and their spouses.

Table A3.8. Lottery Prizes and Household Labor Earnings: PLS and Kombi Samples

Panel A: Husband Wins the Lottery

	Winner (1)	Spouse (2)	Difference (3)	Household (4)
Prize Amount (SEK/100)	-1.314	-0.452	-0.862	-1.766
SE	(0.470)	(0.311)	(0.502)	(0.618)
p	[0.005]	[0.146]	[0.086]	[0.004]
Household member	Husband	Wife		
N	66,675	66,675	66,675	66,675

Panel B: Wife Wins the Lottery

	Winner (5)	Spouse (6)	Difference (7)	Household (8)
Prize Amount (SEK/100)	-0.697	0.010	-0.706	-0.687
SE	(0.315)	(0.582)	(0.668)	(0.655)
p	[0.027]	[0.987]	[0.291]	[0.294]
Household member	Wife	Husband		
N	63,035	63,035	63,035	63,035
p -value equal effects between panel A and B	0.275	0.484	0.852	0.231

Panel C: Primary Earner Wins the Lottery

	Winner (9)	Spouse (10)	Difference (11)	Household (12)
Prize Amount (SEK/100)	-0.956	-0.536	-0.420	-1.491
SE	(0.451)	(0.333)	(0.527)	(0.593)
p	[0.034]	[0.108]	[0.425]	[0.012]
Household member	Primary earner	Secondary earner		
N	66,888	66,888	66,888	66,888

Panel D: Secondary Earner Wins the Lottery

	Winner (13)	Spouse (14)	Difference (15)	Household (16)
Prize Amount (SEK/100)	-1.080	-0.191	-0.889	-1.272
SE	(0.311)	(0.559)	(0.618)	(0.660)
p	[<0.001]	[0.732]	[0.150]	[0.054]
Household member	Secondary earner	Primary earner		
N	62,826	62,826	62,826	62,826
p -value equal effects between panel C and D	0.820	0.597	0.563	0.805

Notes: This table reports event-study estimates obtained by estimating equation (2) separately on winners, winners' spouses, and at the household level for winners that were married prior to winning the lottery. Panel A and B report the results separately depending on whether the husband or wife wins. Panel C and D report results separately depending on whether the primary or the secondary earner wins. The prize amount is scaled so that a coefficient of 1.00 implies a 1 SEK increase in earnings per 100 SEK won. All regressions include baseline controls for both winners and their spouses.

Table A3.9. Comparing Winners and Spouses

Panel A: Married Winners

	Full sample		PLS		Kombi	
	Winners (1)	Spouses (2)	Winners (3)	Spouses (4)	Winners* (5)	Spouses* (6)
Age	51.48	51.98	50.02	49.93	54.64	53.40
Born in the Nordic Countries	0.964	0.961	0.963	0.960	0.980	0.967
Female	0.525	0.475	0.506	0.494	0.304	0.696
Labor income t = -1	219,422	202,965	224,661	218,183	267,796	228,997
Winner dummy as dependent variable						
p-value joint significance of controls	0.000		0.000		0.000	
Adjusted R^2 (within couples)	0.004		0.004		0.163	
Amount won as dependent variable						
p-value joint significance of controls	0.067		0.069		0.002	
Adjusted R^2 (within couples)	0.000		0.000		0.001	
N	132,975		118,663		12,582	

Panel B: Both Spouses Previously Played the Lottery

	PLS		Kombi	
	Winners (3)	Spouses (4)	Winners* (5)	Spouses* (6)
Age	50.15	50.04	55.608	55.359
Born in the Nordic Countries	0.967	0.966	0.978	0.981
Female	0.490	0.510	0.429	0.571
Labor income t = -1	223,893	218,805	259,505	239,198
Winner dummy as dependent variable				
p-value joint significance of controls	<0.001		<0.001	
Adjusted R^2 (within couples)	0.001		0.023	
Amount won as dependent variable				
p-value joint significance of controls	0.446		0.790	
Adjusted R^2 (within couples)	<0.001		<0.001	
N	76,412		1,316	

Panel C: Both Spouses Played in Same Lottery Draw

	PLS		Kombi	
	Winners (3)	Spouses (4)	Winners* (5)	Spouses* (6)
Age	49.64	49.52	55.67	55.37
Born in the Nordic Countries	0.970	0.969	0.979	0.983
Female	0.485	0.515	0.405	0.595
Labor income t = -1	219,387	213,676	257,921	232,448
Winner dummy as dependent variable				
p-value joint significance of controls	<0.001		<0.001	
Adjusted R^2 (within couples)	0.001		0.039	
Amount won as dependent variable				
p-value joint significance of controls	0.686		0.883	
Adjusted R^2 (within couples)	<0.001		0.003	
N	49,847		943	

Notes: This table shows summary statistics for married winners and their spouses. The table also reports the results from a regression with either an indicator variable for the winning spouse, or the amount won, as the dependent variable. The table shows the p-value from an F-test testing the joint significance of the control variables. Panel A includes all married couples, Panel B restricts the sample to households in which both spouses played the same lottery prior to the lottery event, and Panel C restricts the sample further to samples in which both spouses participated in the same lottery draw as the lottery event.

4. Outcome Variables

In this section, we provide additional information about all outcome variables used in our main analyses. All variables are obtained or derived from information in Statistics Sweden's administrative registers.

4.1. Swedish Income Taxation

We begin by providing some background information about the Swedish tax system during our period of study. The background information is important for understanding many of our sample restrictions and several of the choices we make when defining our outcome variables.

In 1990, the Swedish tax system underwent a major reform, which greatly streamlined and simplified the taxation of income. The major changes were: (i) a reduction in the number of tax brackets, (ii) reductions of the top marginal taxes to about 50%, (iii) a reduction in the number of deductions allowed and (iv) the abolition of the joint taxation of labor and capital income. Under the old system, a sufficiently large positive wealth shock would, through its positive impact on capital income, move the winner to a higher tax bracket. Winning the lottery thus raised marginal taxes on earnings, a complication that is absent under the new system.

Under the new system, pre-tax wage income is taxed separately from capital income and all wage-earners are allowed to apply a basic deduction (*grundavdraget*). Remaining income is then taxed at a rate determined at the municipal level (around 30%). Additionally, a state income tax (20%) is also levered on all incomes above a certain threshold. Since the reform, the tax system has undergone additional changes, all of which are relatively modest compared to those introduced by the complete overhaul of 1991.

From 1993 a general employee-paid social security contribution (*allmänna egenavgifter*) affects the marginal tax rate of the employee. In 1993 it started at 0.95% and increased to 6.95% in 1999 and was subject to an allowance to the local and state income tax. Since 2000, they have been fixed at 7.00% but got gradually compensated by a tax reduction (with a corresponding decrease in the allowance), so that the marginal effect equaled 0% in 2006.

In 1995, the state tax was raised to 25%, increasing the top marginal tax rate to 55%. In 1999, two brackets were introduced for state taxes, with income in the first bracket taxed at 20% and income in the highest bracket taxed at 25%. Between 1999 and 2002 there was a tax credit for low and middle income persons (*skattereduktion för arbetsinkomster*). And most recently, an earned income tax credit (*jobbskatteavdraget*) was introduced in 2007, the value of which was increased in 2008, 2009 and 2010.

4.2. Calculating After-Tax Incomes

In several of our analyses, we consider annual earnings variables measured net of taxes. We calculate after-tax earnings based on information of the Swedish tax system in Söderberg (1996), Skatteverket (1998-2010) and Du Rietz, Johansson, and Stenkula (2013). Our calculations use these sources to determine the size of the basic deduction, the tax brackets for state taxes and the state tax(es) applicable in each year. In our calculations, we assume a municipal tax rate equal to the average from the year in question.

When calculating after-tax incomes, an important conceptual question is to what extent benefits implicit in social security contributions (SSC, *arbetsgivaravgifter*) should be treated as income. In Sweden, SSC are mostly transferred directly by an individual's employer to the state. However, part of the SSC accrues to the employee in the form of higher pension and sick-leave benefits. Failing to consider these benefits would cause us to understate the value of after-tax income.

Swedish employer-paid SSC is currently 31.42% and is a combination of 13 different components, whereof some can be seen as taxes and others as fees.[1] We follow Flood, Nordblom, and Waldenström (2013) and treat four of them explicitly as fees, so that the benefit part amount to about 70% of the total employer-paid SSC in 2010. This should be seen as an upper bound since some SSC components are only partly linked to future benefits, and the link varies over time. In addition, future benefits are taxed when they are paid out. We use a tax rate of 30% for the latent taxation of these future benefits.

As there are rules in the welfare system for how small and large benefit amounts one can receive, the composition of the SSC in a tax and benefit part also varies across income levels. Flood et al (2013) uses a 0.5 "base amount" (37,100 SEK in 1998) as the lower threshold and 7.5 base amounts the upper threshold. Below and above these respective income levels, additional wage increases does not affect the benefits and the SSC should be considered as a tax.

4.3. Main Measures of Annual Earnings

Below, we define our primary earnings measures. All are measured annually. To reduce the influence of outliers, all six are winsorized at the 0.5th and 99.5th percentile. Due to complication with the taxation of capital income described above, we only consider earnings in 1991 or later as an outcome. We do, however, include the first lag of labor earnings as a regressor in all regressions, even when the lag pertains to a year before 1991. Also, whenever feasible, we include the first lag of the specific earnings measure on the left-hand side even if the first lag is measured before 1991.

Our main measures of earnings are:

*Labor earnings (*original name: *ArbInk).* Sum of wage earnings, income from self-employment and income support due to sickness and parental leave (but not pension income or unemployment insurance payments). This is a broad measure of earnings that we use as our primary earnings measure in the outcome regressions. The first lag of this outcome is included in our set of baseline controls.

[1] The distinction between a tax and a fee is that the former has no direct link between the size of the contribution and the resulting benefit, whereas a fee has a distinct link between them.

*Wage earnings (*original name: *LonInk).* This is a measure of wage earnings defined as the gross wage income paid out by an individual's employer, and any sickness benefits paid.

*Self-employment income (*original name: *FInk or FInkNetto)*. Includes gross income from self-employment, including the part of sick-leave benefits that are paid by the employer, but not income from "passive self-employment".

Taxable earnings (original name: *CSFVI*). This earnings measure includes all kinds of taxable and work-related incomes. In addition to labor earnings, pension income and unemployment benefits are included in this measure since labor earnings are taxed jointly with these sources of income.

After-tax earnings. We compute after-tax earnings by subtracting taxes from taxable earnings. As described in section 4.1 and 4.2 above, we used detailed information about the Swedish tax system, relevant tax brackets and tax rates for every year to compute taxes. We compute two versions of after-tax earnings; with and without including implicit benefits in the SSC.

Disposable income. As a final measure of after-tax earnings, we use disposable income (original variable name: *DispInk*) which includes all types of income visible in public records, including capital income, pensions, unemployment support, sick-leave benefits, and social assistance. Disposable income is measured net of taxes, but since it includes capital income we deduct the net capital income from the disposable income measure. This variable must be interpreted with caution since we have not captured all details of capital taxation when netting out capital income.

4.4. Labor Force Participation

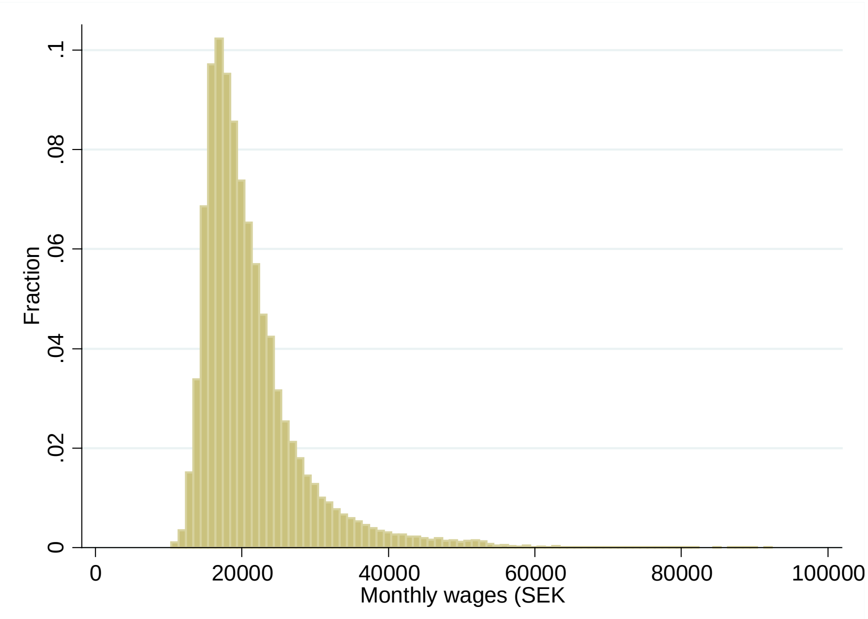
In the analyses presented in the main paper, we define labor force participation as earnings in excess of 25,000 SEK per year (expressed in 2010 SEK). We calculate labor force participation based on labor earnings, wage earnings, and self-employment income.

4.5. Hours Worked and Wages

Data on monthly wages are available in separate registers for private sector blue-collar workers, private sector white-collar workers, and workers employed by the state, county councils ("landsting") and municipalities ("kommuner"), respectively. These data are available from 1985, except for wages for workers in county councils which are not available until 1990. Coverage is not complete in the private sector, however. The private sector data cover all firms with more than 500 employees whereas information for smaller firms comes from a stratified random sample by industry.

We use the average hourly pre-tax wage within a year across all employers a person had during the year (but we drop a few cases were more than 100 employers were listed for a given worker in a given year). Since wages are not observed in every year for every worker, we impute wages for adjacent years. In our main analyses, we consider hours worked based on wages imputed up to three years before and three years after a given year, but we do not impute wages for the post-win period from the pre-win period, and vice versa. A histogram of our main wage measure is shown in Figure A4.1 below.

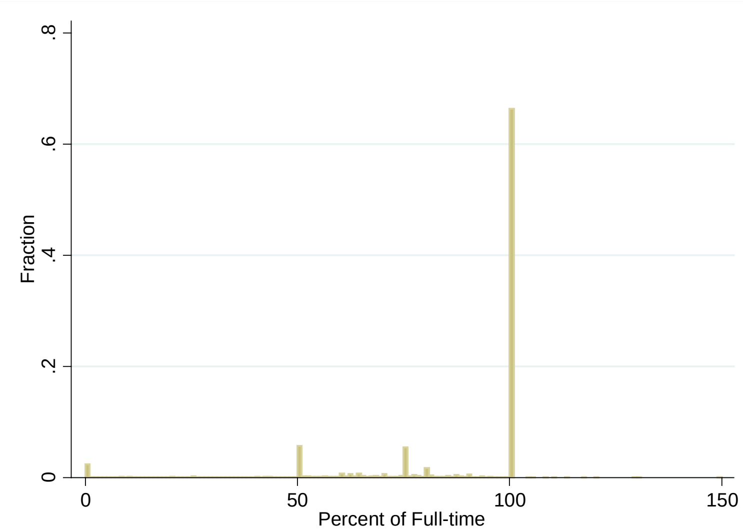
Figure A4.1 Distribution of Wages



Notes: This figure shows the distribution of monthly wages the year before winning the lottery. Missing wages have been imputed from up to four years before the year of the lottery (i.e., three years before the outcome was measured).

The wage data sets also include a survey-based measure of the number of hours worked, measured in terms of "percent of full-time work" (corresponding to about 40 hours per week, or 1880 hours per year). For people with several jobs, we set the variable to fulltime work if all listed jobs where full time jobs, otherwise we set it to missing. As for wages, we impute missing values using information from up to three adjacent years. However, since the survey-measure of hours worked is often missing, we use it in our robustness analysis only. Figure A4.2 shows the distribution of hours worked (expressed in percent of full-time work). There is a clear spike at full-time work (i.e., 100%), but also a substantial fraction of workers who work part-time.

Figure A4.2. Distribution of Hours Worked (Survey-based Measure)



Notes: This figure shows the distribution of survey-based hours worked (in percent of full time) before winning the lottery. Missing values have been imputed from up to four years before the year of the lottery (i.e., three years before the outcome was measured).

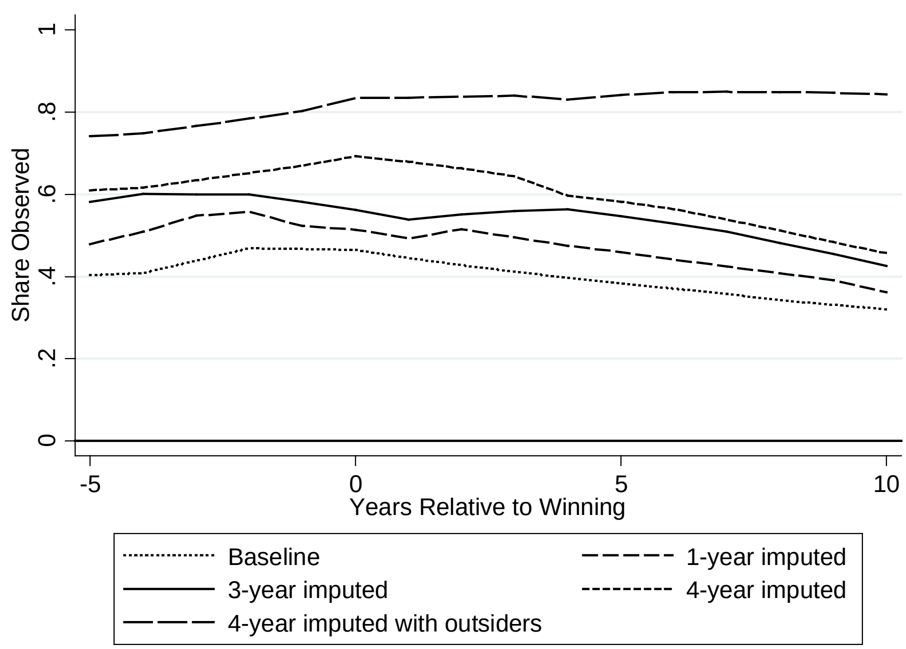
Rather than using the survey-based measure for the number of hours worked, we calculate hours worked in each year as the ratio of wage earnings to wages.[2] Because we have information on monthly rather than hourly wages, we express also this measure in terms of percent of full-time work. In order to reduce the problem of outliers due to division bias (measurement error in wages casing an upward bias in hours worked), we censor hours worked at 125% of full-time work.

Since wages are not observed in every year, we use imputed wages also when calculating hours worked. Figure A4.3 displays the fraction of the sample for which we can compute the number of hours worked, i.e. for which both wage earnings and wages are observed. The year before the lottery event, we observe non-imputed wages for slightly more than 45% of the sample ("baseline"). The share of winners with observed hours falls with time from the lottery, reflecting the increasing share of retirees. Imputing wages up to three years before or after the lottery event (our main wage measure) brings up the share with observed hours 10-15 percentage points, depending on time relative to the lottery. Since we do not impute post-win wages with pre-win wages (and vice versa), there is a dip in the share observed around the time of the win. Dropping this restriction and extending the imputation period to 4 years increases the share observed at the time of the win to almost 70% ("4-year imputed").

[2] Since we have no information on wages as self-employed, we use wage earnings rather than labor earnings when imputing hours worked. By restricting attention to wage earnings, we may in effect underestimate the actual number of hours worked.

We also impute hours assuming that hours are zero for individuals who are outside of the labor force (wage earnings below 25K SEK) and for whom we lack information on wages. Imputing hours in this way (called “4-year imputed with outsiders” in Figure A4.3) allows us to observe hours worked at the time of the win for almost 80 percent of the sample. Since retirees are coded as outside of the labor force, the share observed does not when we set hours to zero for people outside the labor force.

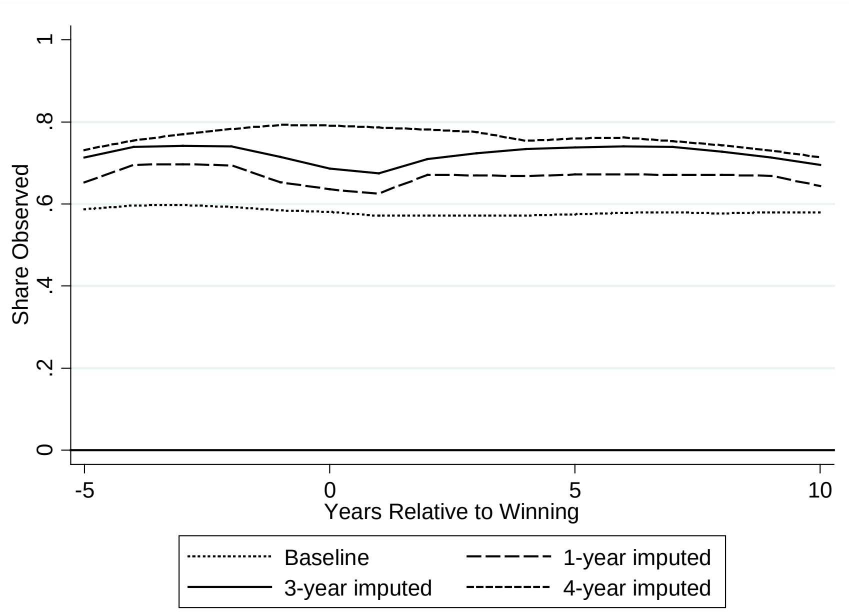
Figure A4.3. Share of Sample with Observed Hours Worked



Notes: This figure shows the fraction of the sample for which we can observe both wage earnings and wages using alternative procedures to impute wages as described in the text. The sample at *t=1,…,10* is limited to workers with observable wage earnings in year 1991 onwards (since we only consider outcomes post-1990 as explained in the paper) whereas the sample at *t=-5,…,-1* is limited to workers with observable wage earnings in any year in the 1986-2010 period (since we use outcomes also pre-1991 as controls).

Figure A4.4 shows the share with observed hours when the sample is restricted to “insiders”, i.e., people with wage earnings in excess of 25K SEK. In this sample, the share observed is between 60 and 80 percent depending on how wages are imputed.

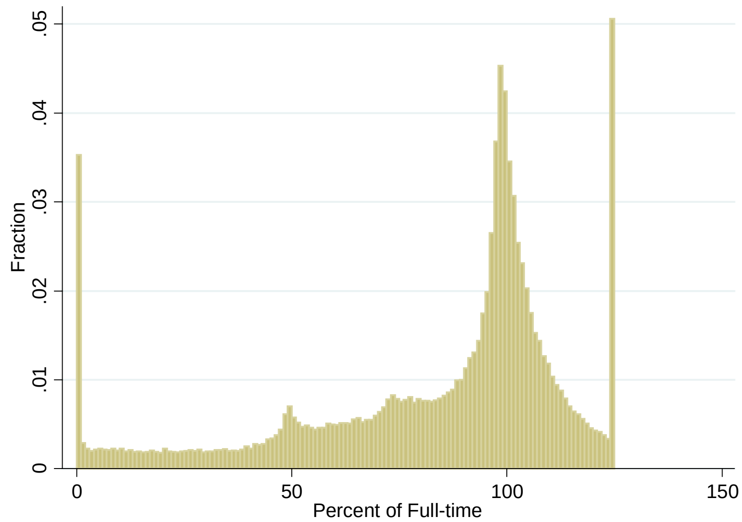
Figure A4.4 Share of Sample with Observed Hours Worked (Insiders)



Notes: This figure shows the fraction of the sample of wage-earners (above 25K SEK) for which we can observe both wage earnings and wages using alternative procedures to impute wages. The sample at *t=1,…,10* is limited to workers with observable wage earnings in year 1991 onwards (since we only consider outcomes post-1990 as explained in the paper) whereas the sample at *t=-5,…,-1* is limited to workers with observable wage earnings in any year in the 1986-2010 period (since we use outcomes also pre-1991 as controls).

Figure A4.5 shows the distribution of hours worked based on our baseline imputed wage measure. As for the survey-based measure, there is a clear spike at full-time work, but the distribution is more dispersed than the survey-based measure. About five percent of the sample has the number of hours worked censored at 125% of full-time. There are a number of reasons for why the earnings- and survey-based measures do not line up perfectly. One reason is that it is difficult to identify people who work overtime in the survey-based data, given the way this variable is constructed. Another issue is that the wages used to convert earnings to hours are not adjusted for work during night-time or over weekends, which often come with a higher wage.

Figure A4.5 Distribution of Hours Worked

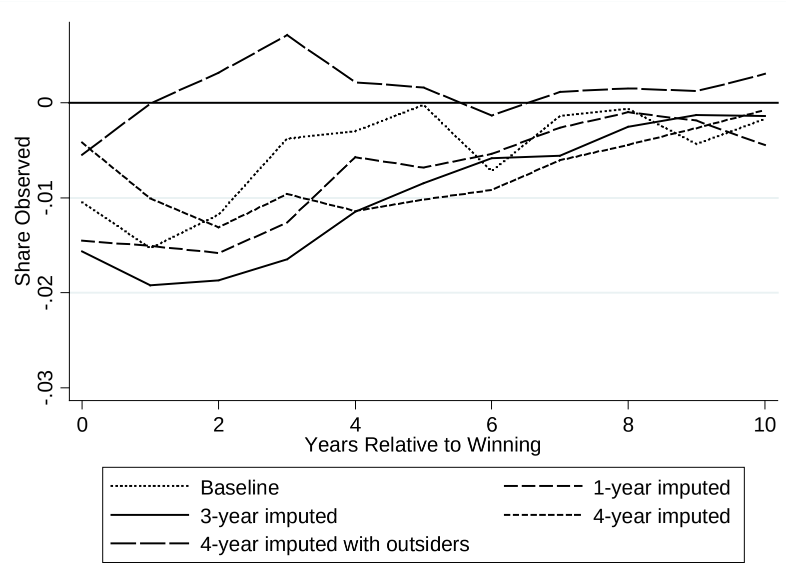


Notes: The figure shows the distribution of hours worked as a fraction of full time work calculated from wage earnings and imputed wages.

Since winning the lottery increases the probability that people leave the labor force, a potential concern is that winning affects selection out of the sample with observable hours, giving rise to a selection problem. Figure A4.6 shows that winners of large amounts tend to quit immediately after the lottery is won, implying that we are unable to impute their number of hours worked. Using pre-win wages to impute post-win wage (which we do in the 4-year imputation) resolves this issue, though it comes at the cost of having to assume that wages are unaffected by amount won (which is not consistent with the evidence, as discussed in the main text). Setting outsider hours to zero, as we do in the alternative 4-year imputation, implies that the share with observed hours is increasing in amount won in the years following the lottery win. The reason is that some people, whose wages we would otherwise not observe, become "observable" by leaving the labor market.

The upshot is that we have no way to impute hours (and wages) that is not subject to criticism. In Section 11, we therefore report results for the full set of hours and wage measures.

Figure A4.6 Effect of Lottery Wealth on Share of Sample Observed



Notes: This figure shows the effect of lottery wealth on the probability that we observe the number of hours worked.

4.6. Employer and Occupation Switching

We code switching with respect to occupation, as well as five types of employer characteristics.

The wage data includes information on occupation from 1996 onwards. We consider occupation at the 1-digit level, thereby coding occupation into 10 different categories. We set occupation category to missing if a worker held occupations in different categories in a given year. We define occupation switching $t = 1,..,10$ years after lottery as the case when a worker holds a job in a different occupation category in year t and year t = -1. When occupation is missing at t = -1, we impute occupation from preceding years back to t = -5.

Employer-employee matched data is available for the entire Swedish workforce from 1986. The data list all firms that a person was employed by in a given year. Since workers may have several jobs in a year, we focus on the employer that paid the highest income in a year. We code five different "switching-variables" that measure changes with respect to: 1) employer (firm-level); 2) workplace; 3) industry (1-digit); 4) municipality; 5) region. All variables are measured relative to the employer at t = -1, i.e. they are set equal to 1 in year $t > 0$ if the value is different than the value for the employer in the year prior to winning, and 0 otherwise.

5. Additional Details about Model Simulation

5.1. Dynamic program

In simulating the model, recasting the model as a discrete-time dynamic program is useful. In each period *t*, the individual chooses consumption, work hours, and next period's assets in order to maximize the following expression:

$$U_t(A_t) = \max_{c_t, h_t, A_{t+1}} \left\{ \beta \log(c_t - \gamma_c) + (1-\beta)\log(\gamma_H - h_t) + \left(\frac{1}{1+\delta}\right) U_{t+1}(A_{t+1}) \right\}$$
$$A_{t+1} = (1+\mathrm{r})(\mathrm{A}_t + \mathrm{w}_t h_t - c_t)$$
$$A_T \geq 0.$$

In the simulations, we exploit the dynamic programming property that, holding constant the choice of A_{t+1} (given A_t), one can solve for optimal choices of c_t and h_t in closed-form. To see this, treat A_t and A_{t+1} as constant. Then, the continuation utility is a constant and is not affected by choice of consumption and hours. To solve the model computationally, we start with the discrete-time transversality condition $A_T = 0$ and solve the model backwards.

5.2. Minimum-distance criterion and standard errors

The estimates from the simulated model are defined as $\boldsymbol{\pi}(\boldsymbol{\theta})$, where $\boldsymbol{\theta}$ corresponds to the vector of parameters to be estimated (i.e., $\boldsymbol{\theta} = (\delta, \beta, \gamma_h)$); the corresponding reduced-form empirical estimates of each of these moments are defined as $\hat{\boldsymbol{\pi}}$. The simulation procedure is repeated many times to find the combination of parameters that comes closest to matching the main results across all of these groups. We define ”closeness” using the weighted minimum-distance criterion

$$m = (\hat{\boldsymbol{\pi}} - \boldsymbol{\pi}(\boldsymbol{\theta}))'\widehat{W}^{-1}(\hat{\boldsymbol{\pi}} - \boldsymbol{\pi}(\boldsymbol{\theta}))',$$

where $\widehat{W}^{-1}$ is a diagonal matrix of the inverse of the estimated sampling variance for each reduced-form parameter estimate. The parameter vector that minimizes the criterion above is given by $\widehat{\boldsymbol{\theta}}$, which gives the model-based estimates. The standard errors for this estimated parameter vector (which incorporate the sampling error in the reduced-form estimates) can be computed from the estimated variance-covariance matrix

$$V = (\hat{G}'\widehat{W}^{-1}\hat{G})^{-1},$$

where $G = \partial\boldsymbol{\pi}(\widehat{\boldsymbol{\theta}})/\partial\boldsymbol{\theta}$. Because 11 reduced-form empirical moments are used to estimate three model parameters, we can implement a specification test using the test statistic $\left(\hat{\boldsymbol{\pi}} - \boldsymbol{\pi}(\widehat{\boldsymbol{\theta}})\right)' \widehat{W}^{-1}\left(\hat{\boldsymbol{\pi}} - (\boldsymbol{\theta})\right)'$, which is distributed as $\chi^2(11-3) = \chi^2(8)$.

6. The Swedish Pension System[3]

In this section, we describe the Swedish pension system in order to motivate why a binding retirement age equal to 65 is a reasonable modeling assumption. While the pension system allows for retirement from the age of 61, we show that the modal age of retirement during our period of study was 65, and that the far majority of people had retired at age 67.[4] The pattern in the data is consistent with the financial incentive not to retire early inherent in the public pension system, and with the discrete fall in employment protection at age 65 (before 2001) or 67 (after 2001).

6.1. The Swedish Pension Reform

The Swedish public pension system was reformed in 1998. The reform implied a shift away from what was mainly an unfunded pay-as-you-go system, to a pension system based on a defined contribution plan. The new system gradually replaced the old system from January 1, 1999.

Persons born 1937 or earlier only get pensions from the old system, whereas those born between 1938 and 1953 get benefits from both systems (with a proportionally lower share from the old system for younger cohorts). Persons born 1954 or later receive pension through the new system only.

We study labor supply between 1991 and 2010, implying that cohorts born between 1926 and 1955 reach age 65 during our sample period. In the pooled lottery sample, 27.0% are born prior to 1938 and receive pension from the ATP system, 48.3% are born between 1938 and 1953 and are covered by the interim rules and 4.3% are born 1954 or 1955 and receive pension from the post-reform system. Consequently, both systems are relevant in our context, but the majority of our sample will be more strongly affected by the rules in the old system. Since retirement incentives differ under the two regimes, we describe both the pre- and post-1998 pension system below.

6.2. The Old Public Pension System

The old pension system consists of two parts, *Allmän tilläggspension* (ATP) and *Folkpension*. Pension benefits in ATP are determined by earnings from the 15 years during which a person earned most, given that he or she had worked at least 30 years between age 16 and 65. The amount is lowered by 1/30 for each year without income. The final pension benefit corresponds to 60 percent of the average earnings (counting only annual income between one base amount and 7.5 base amounts[5]) over the 15 years with the highest earnings. Pensions are eligible from the age of 61 but diminish by 0.5 percent for each month before 65 benefits are received and increase by 0.7 percent for each month after 65, up until the age of 70. After that, delaying

[3] This section builds largely on Barr (2013) and Bohlin and Gidehag (2002).
[4] For some groups, retirement is common even before 61. For example, some state employees, politicians, firefighters, military officers and some scenic professionals can retire many years earlier and then receive a part of their income until they turn 65.
[5] As of 2010, one base amount is 42,400 SEK.

retirement does not increase pensions further. Hence, a worker that retires at 61 receives 76 percent of the pension received at 65 while waiting until 70 yields a pension of 142 percent.

The *Folkpension* is a small pension which is independent of labor market earnings (0.785 base amounts for married and 0.960 for unmarried persons per year). Retirees with no (or very little ATP) get a small extra pension *pensionstillskottet* which is decreasing in pensions received from the ATP system.

6.3. The New Public Pension System

The post-1998 pension system consists of three parts: the income pension, the premium pension and the guarantee pension. A key difference between the new and old system is that pensions are assessed based on lifetime earnings in the system: The income and premium pensions are both based on contributions paid by employers, with the bulk of the contributions (86.5%) allocated to income pensions.

The third part of the public pension system is guarantee pension, which works as a basic security for those with very little, or no pensionable income during their working life. It is not financed by contributions but instead through the government budget and is linked to prices instead of the aggregate wage increases. The pension is eligible from age 65 and is fully paid for those who have lived in Sweden for at least 40 years, and proportionally lowered for those that have lived in Sweden fewer years. The guarantee pension benefit is reduced when the income and premium pension increases.

The incentive to delay retirement is stronger in the new system. People in the new system that retire at age 61 receive 72 percent of the pension received at 65 while waiting until 70 gives 158 percent. Unlike the old system, earnings after retirement also add to the pension entitlement, and benefits are recalculated every year a new contribution is recorded.

6.4. Occupational and Private Pensions

In addition to the public pension system, there are occupational pensions that are established though collective agreements on the labor market. Most of these have a contribution rate of 4.5% up to the income ceiling (7.5 base amounts), and substantially higher contributions above the ceiling. Occupational pension often constitutes a large part of an individual's total pension, especially for high income earners. In cases when no collective arrangement is in place, the occupational pension becomes much harder to predict. About 50% of all Swedes also have some form of private pension, at either the individual, company or industry level.

6.5. Early Retirement

It is also possible to retire early for medical or "labor market reasons". For example, before 1991, the so called *58.3 pensions* implied that some employees were laid off and received unemployment insurance for 450 days before they reached retirement age. Early retirement has since the 1990s become more restricted, and is now only granted because of strict medical reasons. During the 1990s, it was also quite common to retire early with individual retirement contracts (*avtalspensioner*). The employment protection legislation makes it difficult to dismiss senior employees and it was sometimes more profitable to make an agreement that the employee should retire and get paid for the remaining years (Fölster et al 2001). With such a retirement contract, the employee gets a fraction of their present income until they reach the age of 65, and the employer also often contributes so that the final pension received after that does not diminish due to lost work-life income.

6.6. Employment Protection

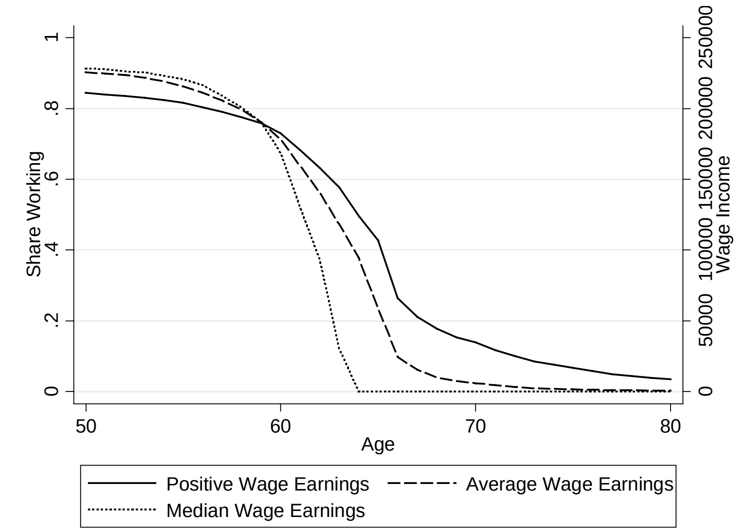
The decision to retire is not only affected by incentives in the pension system, but also by employment protection legislation. After age 65 – extended to age 67 in 2001 – employees are no longer protected by employment protection laws. Since wages typically increases with seniority, whereas productivity in many occupations decreases, employers may have an incentive to dismiss workers when they reach age 65 (or 67 after 2001).

6.7. Descriptive Statistics

As shown above, the public pension system currently rewards workers for postponing retirement until the age of 70. On the other hand, the discontinuous drop in employment protection at age 65 (and later age 67), may induce workers to retire at these ages. In addition, there is an incentive to retire at age 65 for some groups since it is only possible to receive guarantee pension after age 65, and because unemployment and sickness compensation is only paid out prior to age 65. In this section, we show that the assumption of a binding retirement age of 65 fits reasonably well with the patterns in the data.

Figure A6.1 shows annual wage earnings (measured 1991 to 2010) by age for a representative sample. As is clear from the figure, median wage earnings are zero after age 65, and average earnings are very small from age 67. Although there is no formal barrier to working after age 65, the pattern in Figure A6.1 nevertheless suggest that a binding retirement age is a reasonable approximation to patterns in the data.

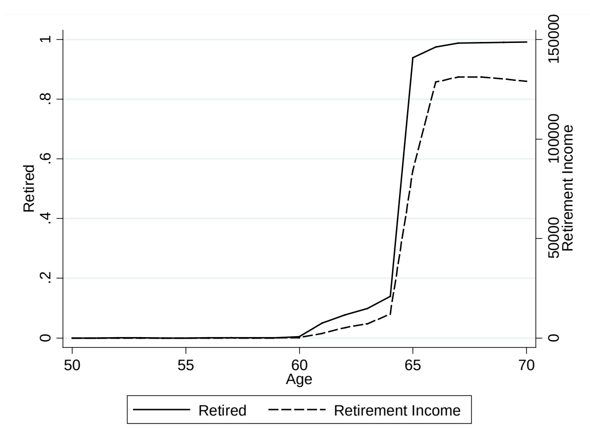
Figure A6.1 Wage Earnings in Swedish Representative Sample

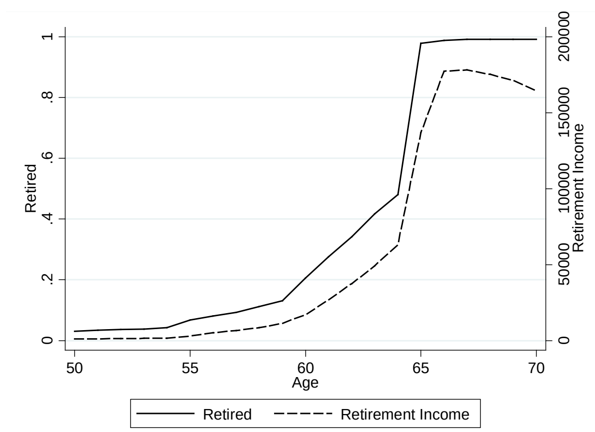


Notes: The figure shows wage earnings for a representative sample of 50,000 individuals taken in year 2000. Wage earnings are measured between 1991 and 2010.

Figure A6.2 instead shows the evolution of pension in a representative sample. The left panel of Figure A6.2 shows income from public pensions and the share of people with non-zero retirement income. Consistent with the drop in wage earnings in Figure 6.1, there is a discontinuous jump in both the level and share of workers with pension income at age 65. The right panel shows the same statistics but also includes other types of pension income (some of which reflect part-time retirement). The right panel shows that the share of people who receive some kind of pension income starts increasing from age 55 onwards, although the increase is small before age 60.

Figure A6.2 Retirement in Swedish Representative Sample





Notes: The left panel shows average income from public pensions for the representative sample as well as the fraction that receive some public pension income. The panel to the right shows the corresponding figures when also other types of pension income are included. The sample is a representative sample of 50,000 individuals taken in year 2000 and pension income is measured between 1991 and 2010.

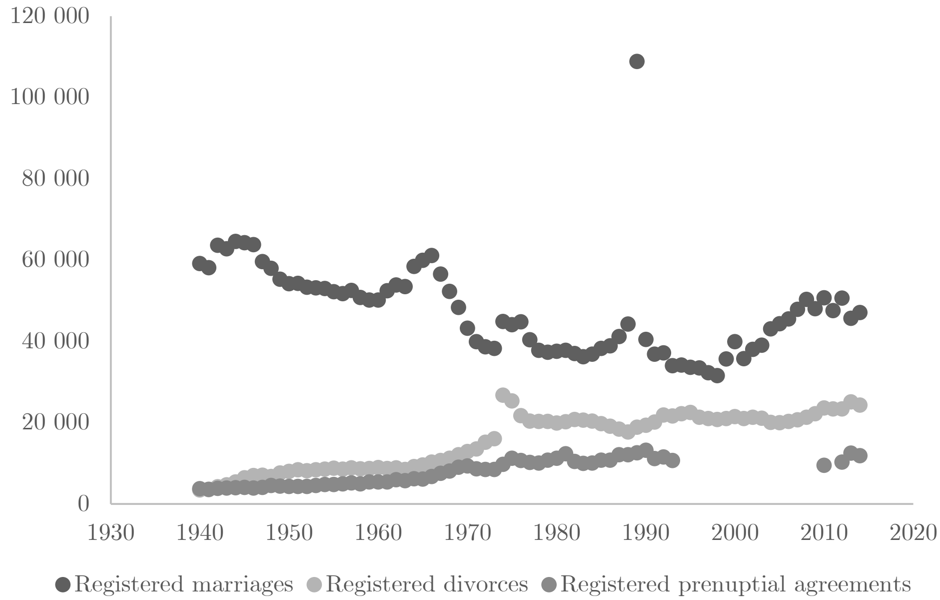
7. Swedish Marriage Law

Under Swedish marriage law, *Äktenskapsbalken* (SFS 1987:230), the basic principle is that assets owned by either spouse before the marriage, or acquired during marriage, is the private property of the owner *during* the time of the marriage (Ch 1 § 3). A lottery prize is thus the private property of the winning spouse, unless the money is deposited in a bank account controlled by both spouses. The only exception to this rule is that both spouses are required to contribute to the household according to their capacities, thus ensuring that no spouse lives below a certain acceptable standard given that the other spouse can help remedy such a situation (Ch 6 §§ 1-2).

However, in case of divorce, the default rule is that all assets (regardless of when they were acquired) are considered marital property (*giftorättsgods*) and split equally between spouses (Ch 11 § 3). If a married couple wishes to diverge from this default rule, they must actively establish a prenuptial agreement (*äktenskapsförord*) in which they specify either that *all* assets, current and future ones, or *particular* assets are to be exempted from what is considered marital property (Ch 7 §§ 1-3). Prenuptial agreements are to be signed by both spouses and can be established (or revoked) before or during marriage, as many times as desired (Ch 7 § 3).

As shown by Figure A7.1, the vast majority of Swedish married couples do not sign a prenuptial agreement despite divorce being common. While marital law clearly states that all assets should be split equally between spouses in the absence of a prenuptial agreement, there is nothing preventing spouses from splitting their assets in a different way should they agree to do so. So how do spouses actually split their assets in case of a divorce? Brattström (2011) conducted a survey of divorced couples in 1997, 2002 and 2007. The survey indicates that most couples (85%) carry out a division of marital property. Two-thirds of marital property divisions involve equal shares to both spouses, while some assets are excluded in a third of the cases. The most common reason for excluding certain property was an agreement at the time of the division. The existence of a prenuptial agreement was stated as the second most common reason, and conditioned wills and gifts from third parties as the third. Three quarters of all estate divisions are made without assistance from either the state or legal counseling.

Figure A7.1 Registered Marriages, Prenuptial Agreements and Divorces 1940-2014

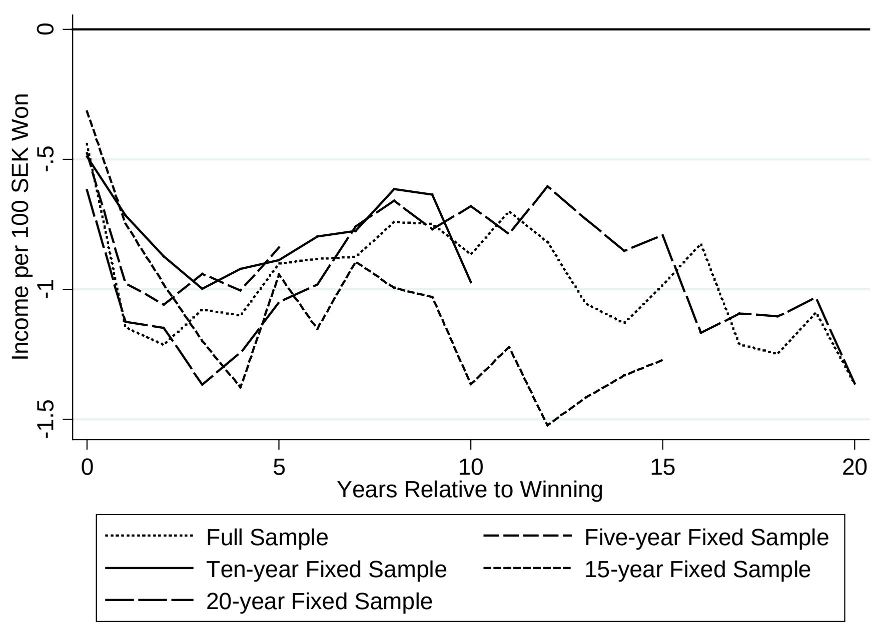


Notes: The same couple may sign as many prenuptial agreements as they like and Swedish statistics do not distinguish between a couple's first contract and later contracts. Neither do statistics distinguish between whether the contract is signed before or during marriage. A contract may also contain the opposite content, namely of revoking formerly individually registered assets. According to Agell and Brattström (2011, p. 139), about 10% of the number of prenuptial agreements are revocations where assets change from having been individual to becoming marital property again. The spike of registered marriages in 1989 is due to a change in Swedish survivor pension, which had the effect that many couples who had formerly been cohabitants decided to enter into marriage (see Persson 2015). Statistics on registered prenuptial agreements 1995-2008 and 2010 are missing. Data are obtained from Statistics Sweden (*SCB*), Agell and Brattström (2011) and the Swedish Tax Agency (*Skatteverket*).

8. Long-term Labor Supply Effects

Figure A8.1 shows that lottery wealth has a negative effect on labor earnings also 20 years after winning. However, the sample changes with time from the lottery, and a potential concern is that composition bias gives a distorted view of how winners spend their wealth with time from the lottery. To address this concern, we estimate the effect of lottery wealth on labor earnings when the sample is held fixed. We observe labor earnings between 1991 and 2010, whereas lottery draws take place between 1986 and 2010. Figure A8.1 therefore only include winners that win between 1991 and 2005 for the five-year horizon, winners between 1991 and 2000 for the ten-year horizon and winners between 1991 and 1995 for the 15-year horizon. Since we observe labor earnings during a 20-year period only for people who won in 1986-1990, we use earnings during 1986-1990 in order to make inference about the earnings response during the first five years for this group. As shown by Figure A8.1, the long-term response for the full sample does not appear to be severely distorted by changes in sample composition.

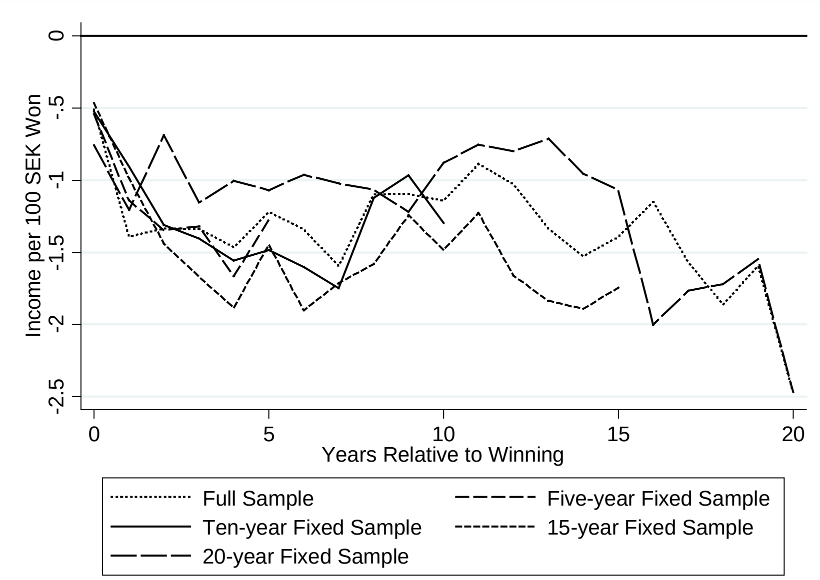
Figure A8.1 Long-term Labor Supply with Fixed Samples



Notes: The figure show the labor supply effect for different time horizons when the sample is held fixed. The five-year estimates include winners that won between 1991 and 2005, the ten-year estimates winners between 1991 and 2000 and the 15-year estimates winners between 1991 and 1995. The 20-year estimates include winners born between 1986 and 1990 and labor earnings measured prior to the tax reform in 1991.

Since winners on average are relatively old, a large fraction of the sample has retired 20 years after winning the lottery. Figure A8.2 therefore shows the corresponding results when the sample is further restricted to those that were at most 45 years of age at the time of winning. Figure A8.2 suggests that there might be a stronger labor supply response after 15 years. However, the long-term estimates for young winners are based on few observations and it is therefore unclear to what extent this pattern is real or due to sampling variation.

Figure A8.2 Long-term Labor Supply with Fixed Samples of Winners below Age 45

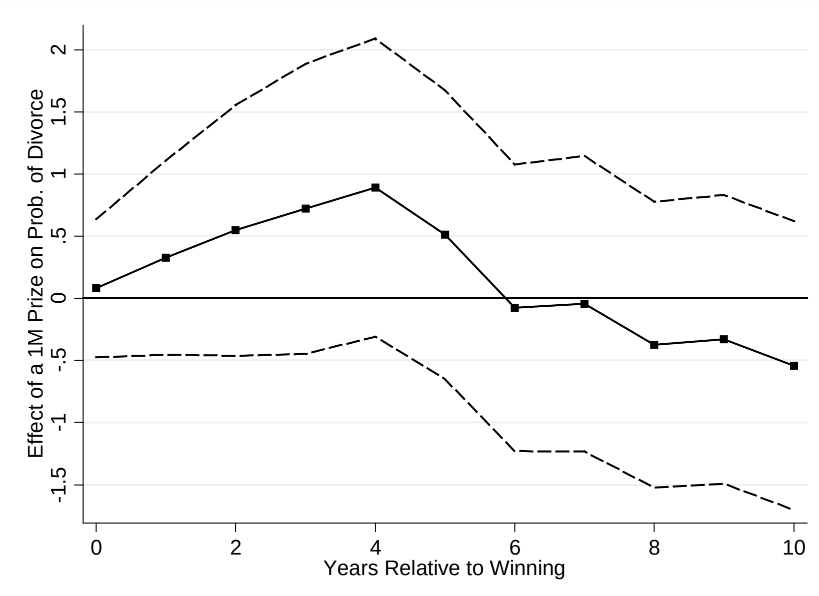


Notes: The figure show the labor supply effect for different time horizons when the sample is held fixed and all samples are restricted to winners below age 45 at the time of winning. The five-year estimates include winners that won between 1991 and 2005, the ten-year estimates winners between 1991 and 2000 and the 15-year estimates winners between 1991 and 1995. The 20-year estimates include winners born between 1986 and 1990 and labor earnings measured prior to the tax reform in 1991.

9. Effect on Household Composition

A potential concern with our analyses of household labor supply is that winning the lottery affects divorce risk. Figure A9.1 shows the estimated effect of lottery wealth on the probability of divorce in each year after the lottery win for winners that were married prior to winning. There appears to be a small increase in divorce risk in the first four years after the lottery, but the effect is not statistically distinguishable from zero.

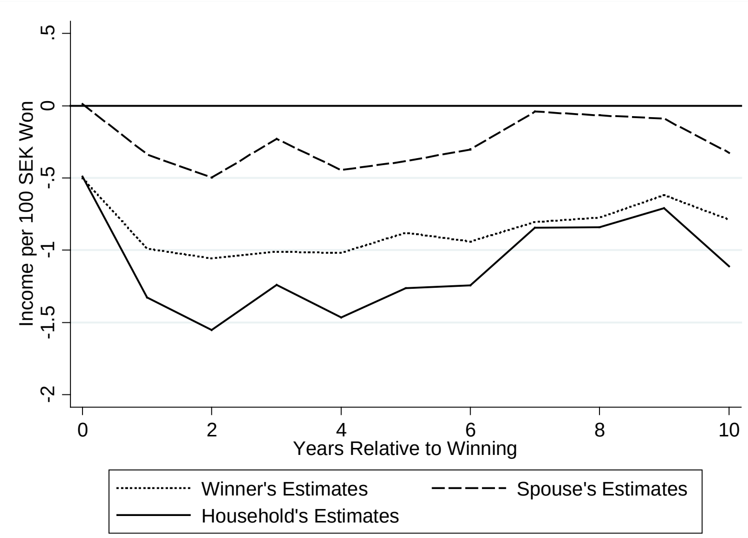
Figure A9.1 Effect of Lottery Prize on Divorce Risk



Notes. This figure reports estimates of equation (2) for winners that were married prior to winning and the dependent variable is an indicator for whether an individual has divorced the spouse he or she was married to in the year prior to winning. The solid line shows the point estimates and the dashed lines the bounds on the 95% confidence interval.

Since Figure A9.1 suggests that there might be a small increase in short-term divorce risk, we conduct a robustness test restricting the sample to married winners who did not divorce their spouse at the time of the win. As shown in Figure A9.2, the effect of lottery wins on household labor supply does not appear to change appreciably with this sample restriction.

Figure A9.2 Effect of Lottery Prize on Household Labor Supply of Married Couples



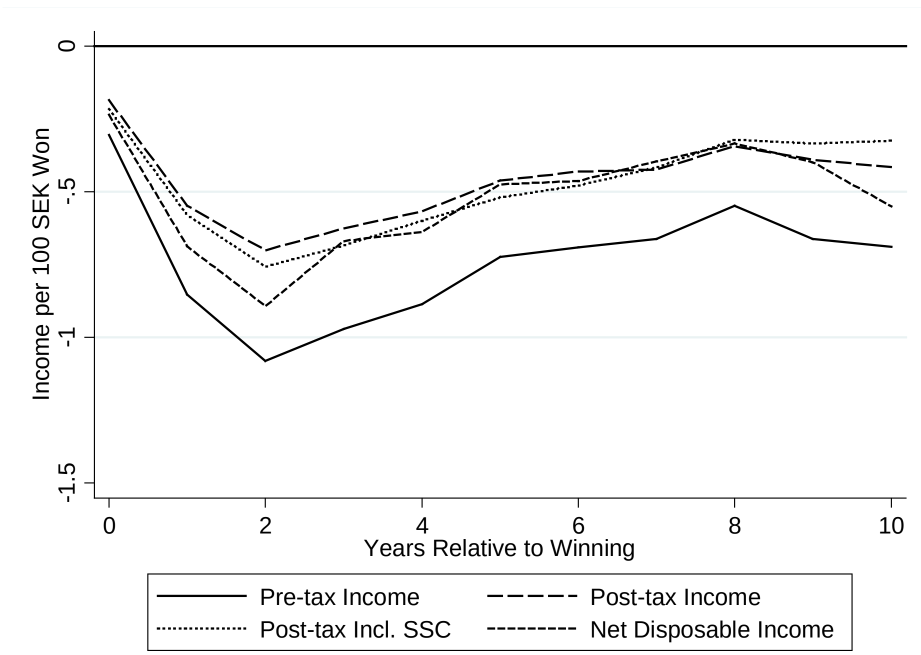
Notes. This figure reports estimates of equation (2) for winners that were still married to their initial spouse in the year labor earnings is measured, but run separately for winners and their spouses.

10. Robustness to Alternative After-tax Earnings Measures

Figure A10.1 shows the effect of lottery wealth on pre- and post-tax income. The solid line shows the effect on pre-tax income based on the broader earnings measure that is used to calculate after-tax income. The long dashed line show the effect on post-tax income and the dotted line the after-tax income when the implicit benefits of social-security contributions (SSC) are included. Compared to pre-tax labor income, the point estimates are about 35% lower, which is close to the average tax rate of the winners during our study period (see Figure A10.2).

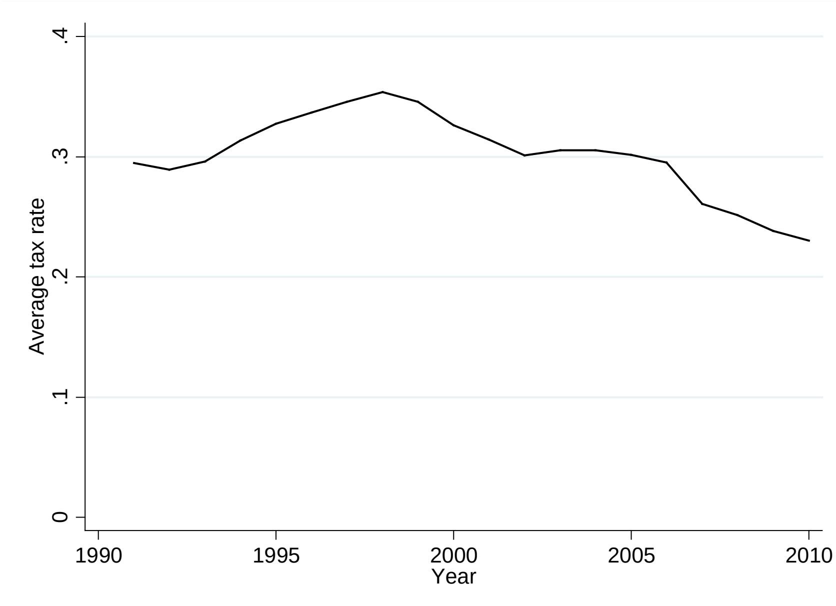
An alternative to calculating after-tax labor income based on information about the tax system is to use information on disposable income from Statics Sweden net of capital income. Since disposable income includes virtually all sources of income net of tax payments, including (for example) pension benefits and social assistance, it is a broader measure than what we ideally would like to capture. Nevertheless, Figure A10.1 shows that the response for disposable income is similar to that for after-tax income.

Figure A10.1 Lottery Prizes and After-tax Earnings



Notes. The figure reports estimates of equation (2) for the pooled sample with different income measures as the dependent variable. The solid line shows the estimates for pre-tax labor earnings, the long dashed line after-tax earnings, the dotted line after-tax earnings when the implicit benefits of social security contributions (SSC) are included and the short dashed line shows the disposable income after netting out capital income.

Figure A10.2 Average Tax Rate in Pooled Lottery Sample

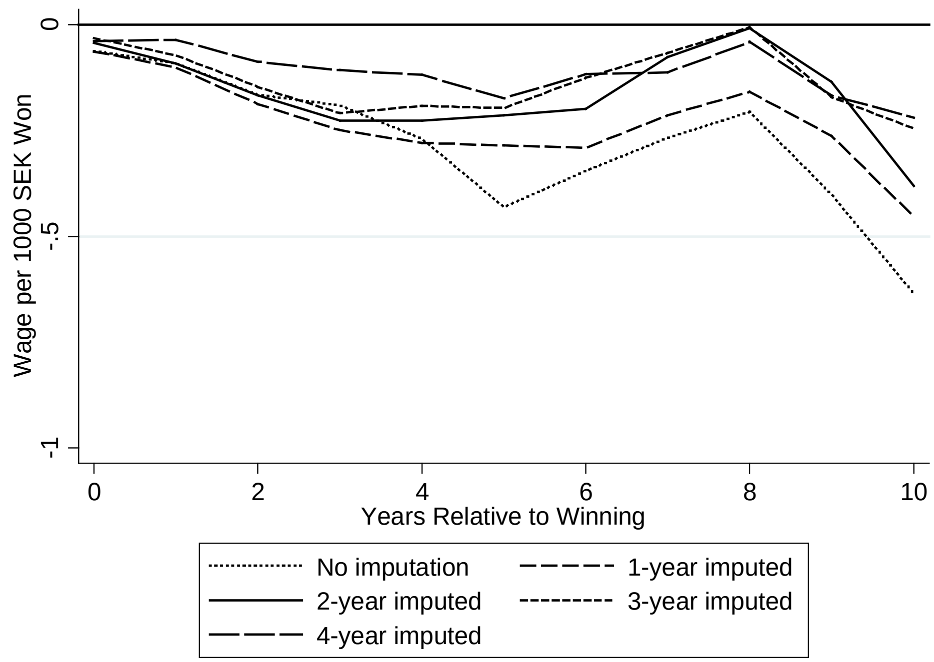


Notes. The figure shows the average income tax rate in the pooled lottery sample for each year between 1991 and 2010.

11. Robustness to Alternative Wage and Hours Worked Measures

Figure A11.1 shows how the estimated effect of lottery prizes on wages depend on how wages are imputed. While the results are not exactly the same, the pattern is similar for all wage measures.

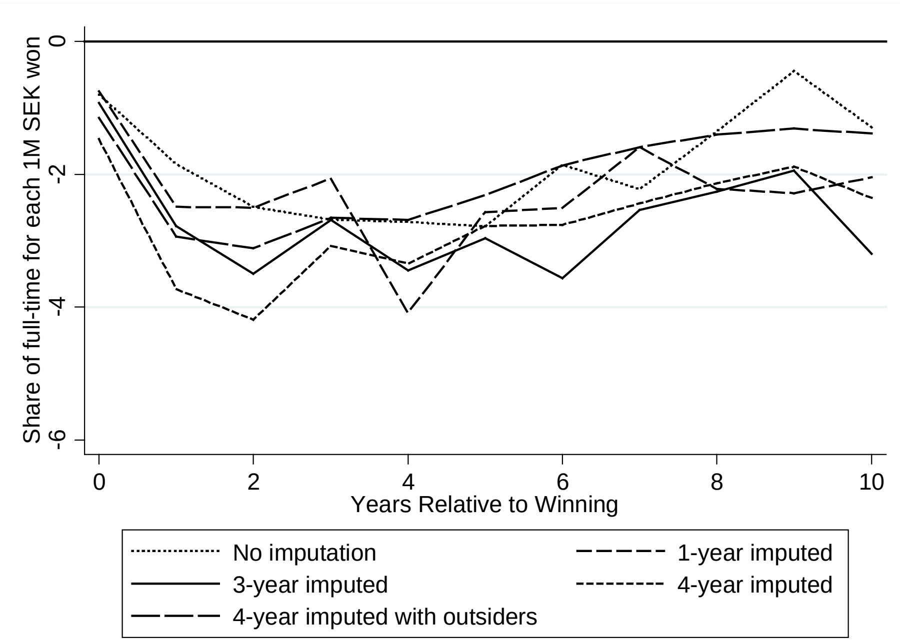
Figure A11.1 Robustness to Imputation of Wages



Notes. The figure reports estimates of equation (2) for the pooled sample with wages imputed using different time windows as described in Section 4.3.

Figure A11.2 shows the results for the five corresponding measures of hours worked. The estimated effects are generally stronger for the 3-year imputation we consider as our main case, but the differences are small except for 10 years after the lottery where precision is lower due to fewer observations. Allowing for imputation from the pre-win period does not change the results appreciably. Including workers outside the labor force diminishes the effect, despite the effect of lottery winnings on the extensive margin. The reason is that we in this case include people who did not work before the lottery win in the estimation sample; since the labor supply response is smaller for this group, the effect is attenuated.

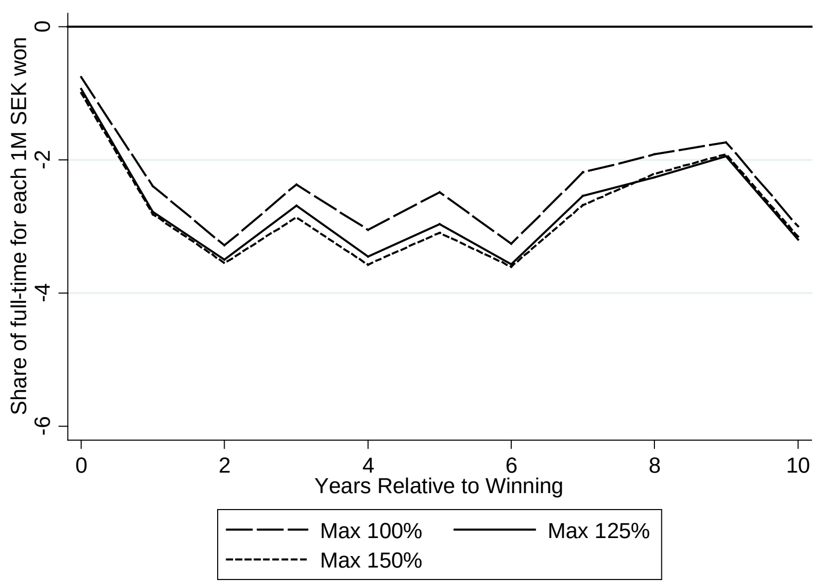
Figure A11.2 Robustness to Imputation of Hours Worked



Notes. The figure reports estimates of equation (2) for the pooled sample with hours worked calculated from wages imputed using different time windows as described in Section 4.3.

As described in Section 4.4, we censor hours worked at 125% of fulltime. Figure A11.3 shows that the estimates are not particularly sensitive to the exact threshold used.

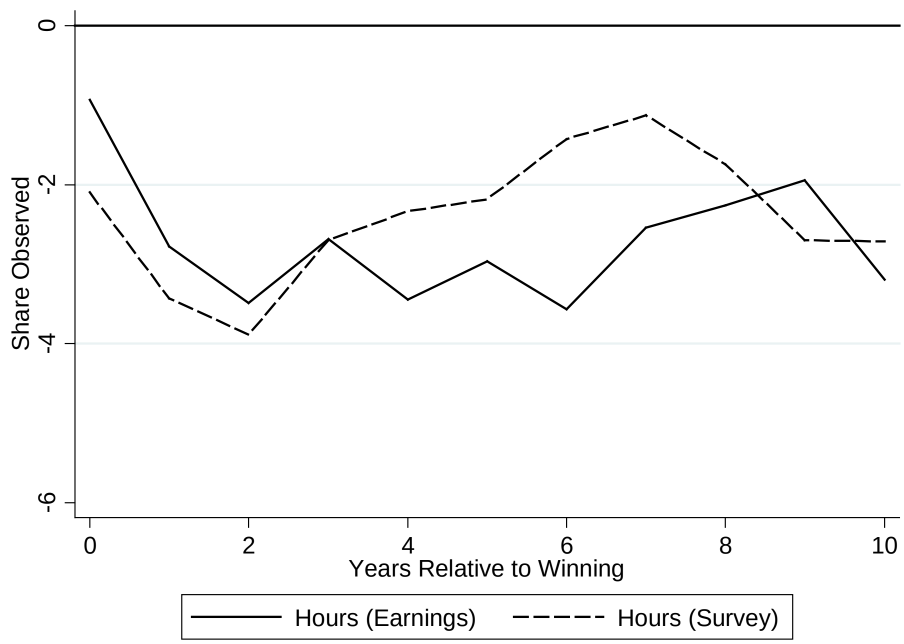
Figure A11.3 Robustness to Censoring of Overtime



Notes. The figure reports estimates of equation (2) for the pooled sample with hours worked calculated using different overtime thresholds as the dependent variable.

Figure A11.4 compares the results for our earnings-based measure of hours worked with the survey-based measure. The earnings-based measure shows a slightly more stable response-pattern over time.

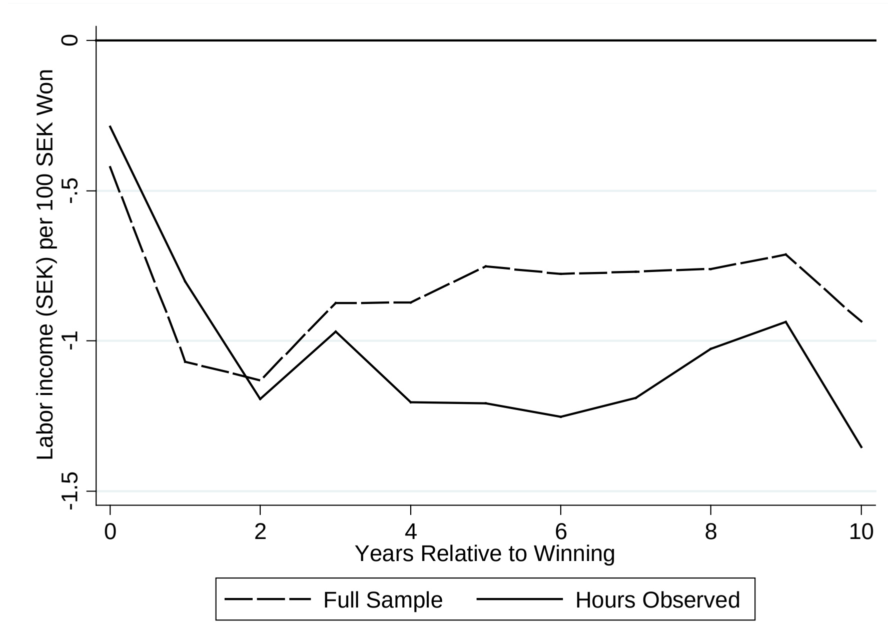
Figure A11.4 Robustness to Type of Measure of Hours Worked



Notes. The figure reports estimates of equation (2) for the pooled sample with hours worked inferred from wage earnings and the survey measure as the dependent variables.

Finally, we investigate whether the sample for which we can observe hours worked is representative of the full lottery sample. Figure A11.5 shows the wage earnings response for the full sample and the hours-sample (imputed with 3-year leads and lags). The wage earnings-response is similar in the two samples, but somewhat smaller for the hours-sample from four years after the lottery event and onwards.

Figure A11.5. Earnings Response in Sample with Observable Hours Worked



Notes. The figure reports estimates of equation (2) for the pooled sample with hours worked inferred from wage earnings and the survey measure as the dependent variables.

12. Naïve Panel Study Estimates

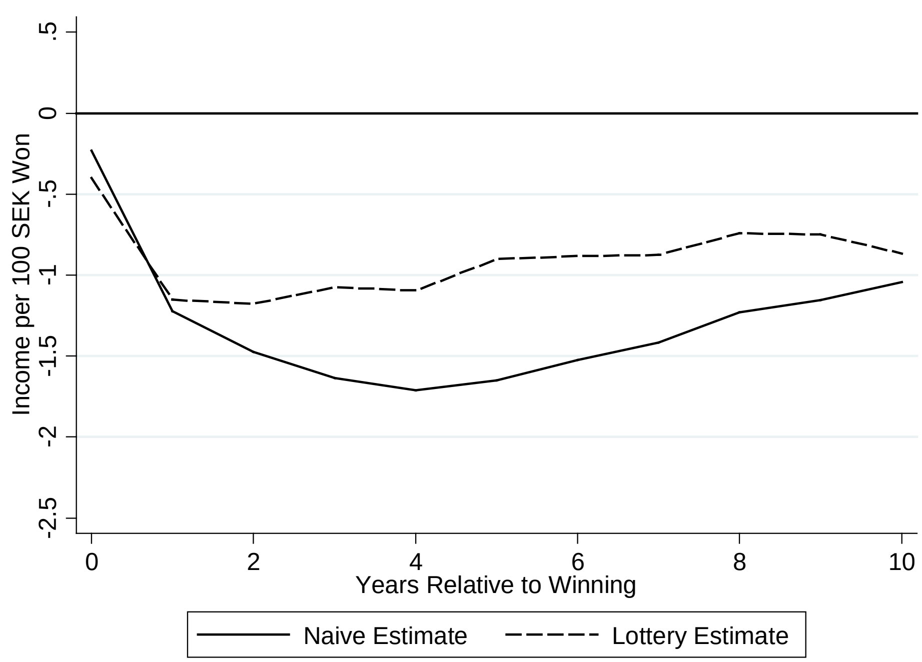
In order to assess how important the carefully constructed lottery cells are for our identification strategy, we estimate "naïve" estimates that only exploit the variation in the timing of lottery prizes within individuals.

We include all lottery winners from the pooled lottery sample, i.e. we exclude the controls in Kombi that never won. We sum all lottery prizes won in a given year for each individual between 1986 and 2010, setting the total prize amount to zero if no prize was won in that year. For the period 1981 to 1986 we set lottery winnings to zero for everybody in the sample. We only include winners up to 10 years after the first lottery win. We then estimate the following fixed-effects regression equation:

$$y_{i,t} = \alpha_i + \beta_0 \times prize_{i,t} + \beta_1 \times prize_{i,t-1} + \cdots + \beta_{10} \times prize_{i,t-10} + \boldsymbol{Z}_{i,t}\boldsymbol{\gamma}_t + \varepsilon_{i,t},$$

where $\boldsymbol{Z}_{i,t}$ includes a cubic polynomial in age and year fixed effects. The dependent variable is gross labor earnings measured in 1991 to 2010. The resulting coefficients are shown in Figure A12.1, which also displays the baseline lottery coefficients as a comparison. The difference is non-trivial, with the naïve estimates being up to 60% larger than the lottery-based estimates.

Figure A12.1. Naïve vs. Lottery-based estimates



Notes. The figure reports estimates of equation (2) for the pooled sample using the basic lottery-based estimates and the "naïve" fixed-effect estimates discussed above.

We have also estimated the "naïve" model using a random-effects estimator with very similar results. The estimates are also very similar if we set lottery winnings to missing between 1981 and 1986 and hence only include labor earnings from 1996 to 2010 in the estimation. If individual fixed effects are excluded, however, the naïve estimates become larger (about twice as large as the baseline lottery estimates).

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