The Output Cost of Inheritance

Marius Brülhart[a,c] Aurélien Eyquem[a] Isabel Z. Martínez[b,c] Enrico Rubolino[a,d]

[a] University of Lausanne
[b] ETH Zurich, KOF Swiss Economic Institute
[c] CEPR
[d] CREST, Institut Polytechnique de Paris

NBER Public Economics Program Meeting

23 October 2025

Motivation: Inheritance Is Big

- Economic importance of intergenerational wealth transfers
  - More than half of private wealth in Western Europe and the US (Alvaredo et al., 2017)
  - Annual bequest flows $\approx$ 10-15% of GDP in advanced economies
  - Main worldwide source of new billionaires (UBS, 2024)

- Implications for equity and efficiency
  - Distributional consequences have been widely studied (Nishiyama, 2002; De Nardi, 2004; Benhabib et al., 2011; Boserup et al., 2016; Nekoei and Seim, 2023; Black et al., 2024)
  - Less developed literature on labor supply effects to inheritance

Labor Supply Effects to Wealth Shocks

- Prior evidence comes from *sudden, unanticipated* wealth shocks (Imbens et al. 2001, Cesarini et al. 2017, Golosov et al. 2024)
  - Inheritances are (at least partly) anticipated
    ⇒ may induce behavioral responses in *advance* of receipt as well as on *impact*
    ⇒ equivalence of inheritance and lottery wins is a "strong assumption" (Kopczuk, 2013)

- Macroeconomic impact
  ⇒ lottery represents a smaller flow compared to inheritance

- Implies positive fiscal externality of inheritance tax (Kopczuk, 2013; Kindermann et al., 2020)

Research Questions

- How do recipients adjust their labor supply after receiving an inheritance?
- How do these responses vary over the life cycle?
- How do responses to inheritance differ from those to lottery wins?
- What are the aggregate consequences for GDP?

Our Paper in a Nutshell (1)

Empirical estimation

- Swiss tax data matching earnings with
  - 5,000 lottery wins
  - 135,000 inheritances

- Reduced-form results (DiD, event studies)
  - Earnings responses are negative and long-lasting
  - Stronger responses for older workers, partly through early retirement
  - Women's labor supply is more elastic than men's
  - Weaker responses to inheritance than to lottery wins

Our Paper in a Nutshell (2)

Model

- Life-cycle model with endogenous labor supply (De Nardi, 2004)
  - Labor supply response varies by age and on whether the shock is expected
  - When unexpected, stronger *impact* but smaller *lifetime* response than when anticipated

Counterfactual policy experiments

i. What if inheritance were taxed away (and dissipated)?

   $\Rightarrow$ Removing inheritance would increase GDP by 1.1% (**output cost of inheritance**)

ii. What if the age distribution of bequests were shifted?

   $\Rightarrow$ projected $\uparrow$ life expectancy lowers the output cost by 0.2 p.p.

Overview

Data

- Tax data from canton of Bern ($\approx$ 12% of Swiss population), 2002-2019
  - Inheritances (N=135,150); avg size = CHF 129,038
  - Lottery wins (N=5,430); avg size = CHF 123,261
  - Present-value adjustment
- Individual panel dataset
  - Income by source; (household) wealth; basic demographics
  - Labor earnings: employment income plus two-thirds of self-employment income
- Sample selection:
  - Wealth shock of at least CHF 10,000 ($\approx$ 10,000 USD)
  - Multiple shocks (16%) $\Rightarrow$ pick the largest shock if $\geq$ 2 x 2nd-largest shock
  - Check: lottery player heirs ($\approx$ 13% of heirs)

summary statistics | present-value adjustment | age distribution | N of events per-person

Identification Strategy

- Leverage variation in the *size* of the shock W_i^{pv}, conditional on receipt year and age cohort

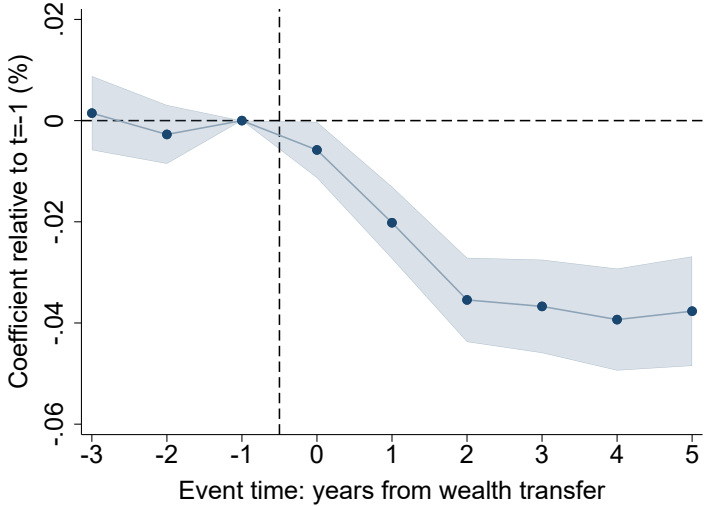
$$\log(y_{i,t}) = \sum_{k \neq -1; k=-3}^{5} \beta_k \cdot \mathbf{1}(K_{i,t} = k) \cdot \log(\mathcal{W}_i^{pv}) + \delta_i + \gamma_{a(i),t} + u_{i,t} \tag{2}$$

- δ_i: individual FE; $\gamma_{a(i),t}$: calendar year-by-age cohort FE
- β_k: labor supply elasticity
- Identifying assumption: $cov(\log(\mathcal{W}_i^{pv}), u_{i,t} | \delta_i, \gamma_{a(i),t}) = 0$

  $\Rightarrow$ Parallel trend assumption: $\beta_k = 0$ for $k < 0$

  $\Rightarrow$ Anticipation may still affect levels, but pre-shock *changes* are unrelated to $\log(\mathcal{W}_i^{pv})$

Earnings Response to Inheritance: Event Study

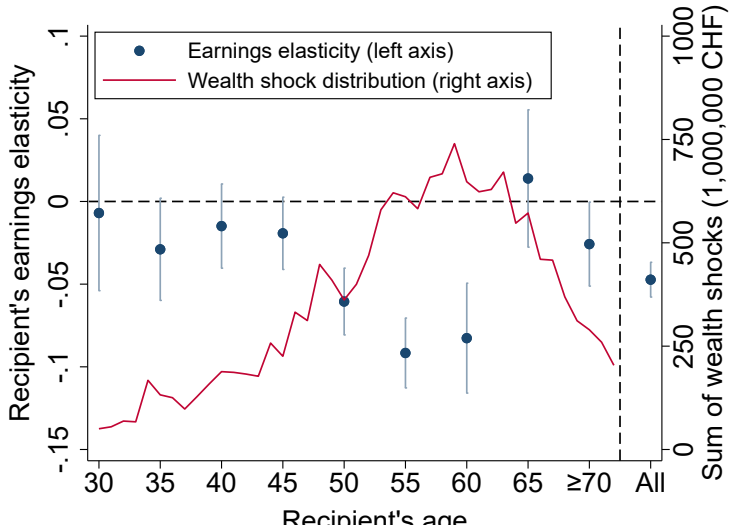


longer window | binscatter

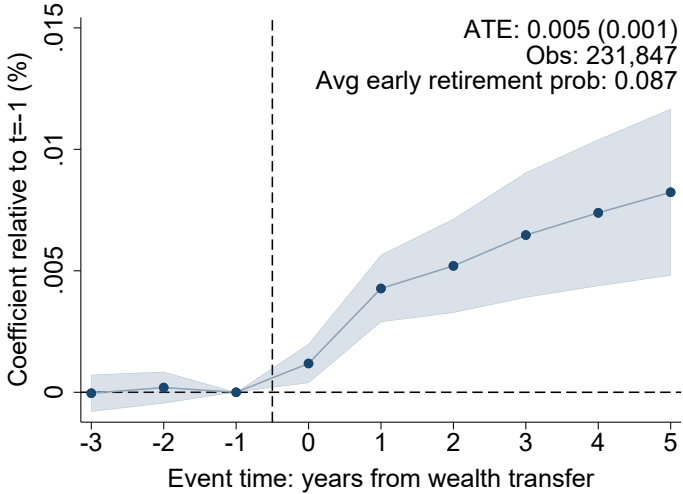
Earnings Responses to Inheritance and to Lottery Wins

	Inheritance (1)	Lottery win (2)
Earnings elasticity	-0.046***	-0.082***
	(0.005)	(0.031)
Obs.	1,219,122	47,308
N of recipients	135,150	5,340
Average earnings (CHF)	43,500	44,029
Wealth (CHF, p.v. adj.)	349,703	352,662
Wealth (CHF, nominal)	129,038	123,261
On impact MPE (1,000 CHF)	-6 CHF	-10 CHF
Remaining worklife MPE (1,000 CHF)	-43 CHF	-148 CHF

Age Profile of Earnings Responses

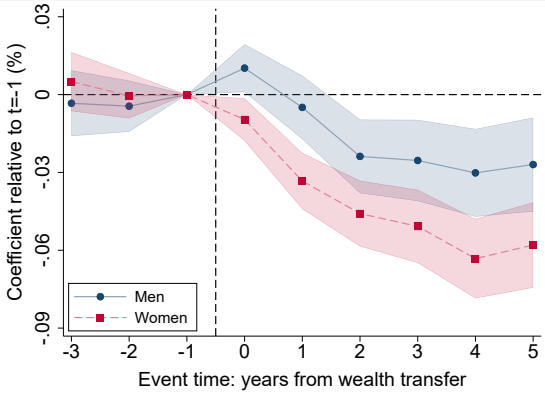


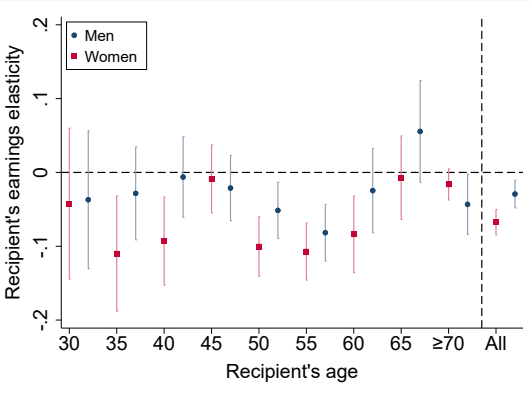
Early Retirement



by gender | intensive vs. extensive

Gender





Heterogeneity by children | Heterogeneity by pre-shock income/wealth

Robustness

- Additional controls: figure
- Balanced sample: figure
- Scale treatment by pre-shock income: figure
- Sensitivity to CHF 10,000 threshold: figure
- Discrete treatment: figure
- Comparing heirs with lottery winners: figure
- By type of asset: figure
- Household-level estimates: figure

Overview

Life-cycle Model with Labor Supply

- Life-cycle model with endogenous labor supply in partial equilibrium
  - Age specific incomes and survival risk (De Nardi, 2004)
  - Closed-form solution for consumption and work hours in each period

- Calibration
  - Match life-cycle income (Bern data); survival prob (WHO)
  - Set r (3%), κ for Frisch ≈ 0.3 (Chetty et al., 2011)

- Wealth shocks arrive at different ages and can be of two types:
  1. Unexpected (lottery-like): no anticipation; only response *on impact*
  2. Expected (inheritance-like): earnings adjust also *before* receipt

Calibration

Elasticities: Structural and Empirical

Structural elasticity

$$\xi_a^{struct} = \frac{\log \mathcal{Y}_{i,a} - \log \mathcal{Y}_{i,a}^{ns}}{\log \mathcal{W}_{i,a}}$$

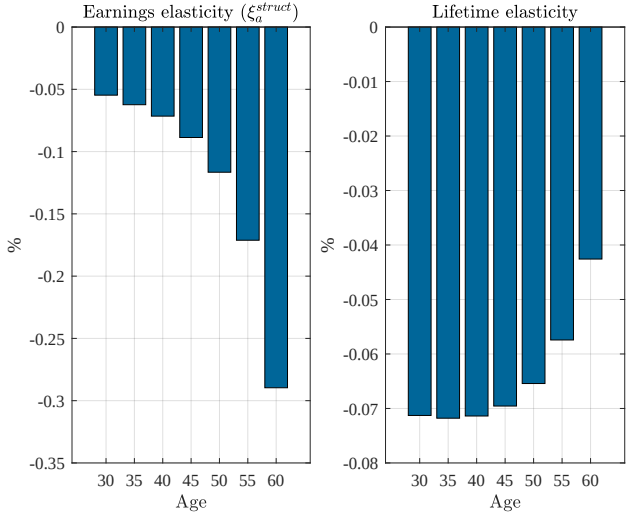
- Compares earnings w/ wealth shock to a counterfactual w/o wealth shock

Elasticity upon impact

$$\xi_a^{impact} = \frac{(\log \mathcal{Y}_{i,a} - \log \mathcal{Y}_{i,a-1}) - (\log \mathcal{Y}_{i,a}^{ns} - \log \mathcal{Y}_{i,a-1}^{ns})}{\log \mathcal{W}_{i,a}}$$

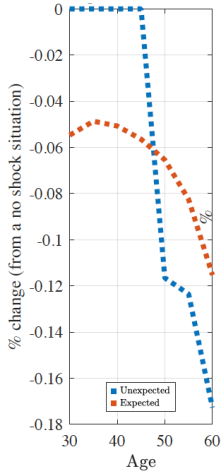
- Measures change in earnings *growth* due to shock
- What we measured empirically
- Anticipation of $\mathcal{W} \Rightarrow \xi_a^{impact} \neq \xi_a^{struct}$

Unexpected Shock at Different Ages



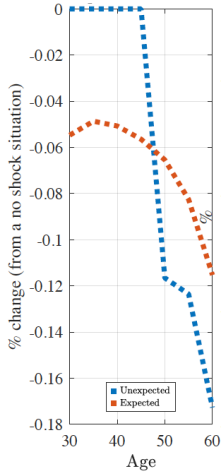
Expected vs. Unexpected Wealth Shocks

Example: shock at 50

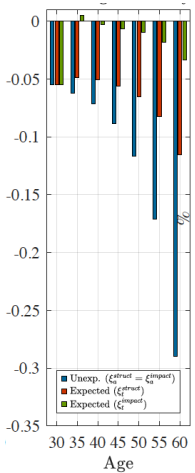


Expected vs. Unexpected Wealth Shocks

Example: shock at 50

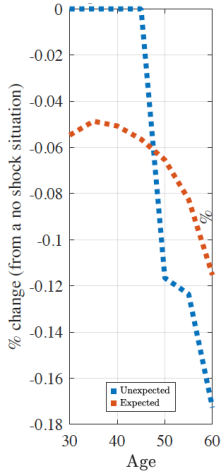


Earnings elasticity

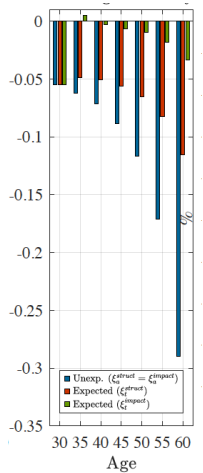


Expected vs. Unexpected Wealth Shocks

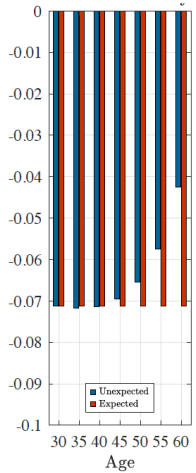
Example: shock at 50



Earnings elasticity



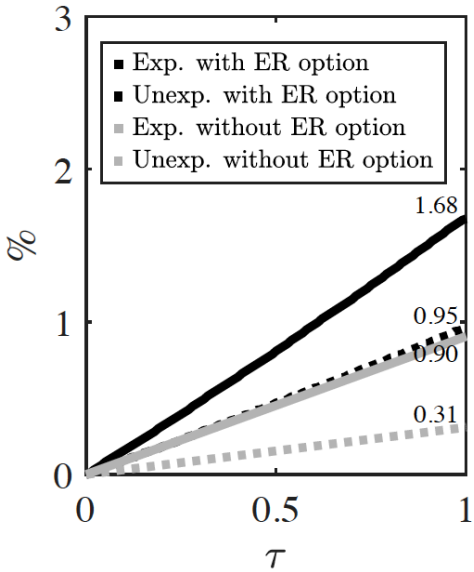
Lifetime elasticity



Comparison with empirical estimates

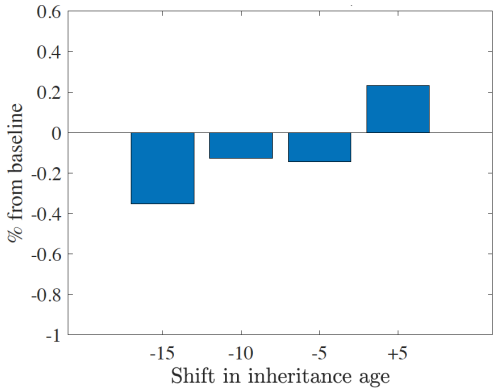
Overview

Shutting Off Inheritance



- Complete confiscation
  $\Rightarrow \uparrow$ labor supply by 1–1.7%
  $\Rightarrow \uparrow$ steady-state GDP by 1.1%
- Positive fiscal externality
  \$0.05 income tax for \$1 of inheritance tax

Shifting the Timing of Inheritance



- Encouraging inter-vivos gifts
  $\Rightarrow$ lower aggregate work incentive
- Projected life expectancy $\uparrow$ (Vollset et al. 2024)
  $\Rightarrow$ labor supply increase by 0.2%
  $\Rightarrow$ output cost fells from 1.1% to 0.9%

Summary

- Positive wealth shocks discourage labor supply
- Whether shock is expected or not matters (inheritance vs. lottery)
- When the shock hits matter (duration effect $>$ on impact effect)
- An inheritance tax pushes heirs to work more (even before inheriting)

  $\Rightarrow$ Eliminating inheritance could raise labor earnings by 1.7%

  $\Rightarrow$ GDP effect of 1.1% (**output cost of inheritance**)
- Limitations:
  - Partial equilibrium analysis
  - Margin of adjustments: hours vs. wage
  - Inter-vivos gifts

References I

Alvaredo, F., Garbinti, B., and Piketty, T. (2017). On the share of inheritance in aggregate wealth: Europe and the USA, 1900-2010. *Economica*, 84:239–260.

Andersen, A. L., Johannesen, N., and Sheridan, A. (2024). Dynamic spending responses to wealth shocks: evidence from quasi-lotteries on the stock market. *American Economic Review: Insights*.

Benhabib, J., Bisin, A., and Zhu, S. (2011). The distribution of wealth and fiscal policy in economies with finitely lived agents. *Econometrica*, 79(1):123–157.

Black, S. E., Devereux, P. J., Landaud, F., and Salvanes, K. G. (2024). The (un)importance of inheritance. *Journal of the European Economic Association*, page jvae056.

Bø, E. E., Halvorsen, E., and Thoresen, T. O. (2019). Heterogeneity of the Carnegie effect. *Journal of Human Resources*, 54(3):726–759.

Boserup, S. H., Kopczuk, W., and Kreiner, C. T. (2016). The role of bequests in shaping wealth inequality: Evidence from Danish wealth tax records. *American Economic Review*, 106(5):656–661.

References II

Brown, J. R., Coile, C. C., and Weisbenner, S. J. (2010). The effect of inheritance receipt on retirement. *Review of Economics and Statistics*, 92(2):425–434.

Cesarini, D., Lindqvist, E., Notowidigdo, M. J., and Östling, R. (2017). The effect of wealth on individual household labor supply: Evidence from Swedish lotteries. *American Economic Review*, 107(12):3917–3946.

Chetty, R., Guren, A., Manoli, D., and Weber, A. (2011). Are micro and macro labor supply elasticities consistent? A review of evidence on the intensive and extensive margins. *American Economic Review*, 101(3):471–475.

De Nardi, M. (2004). Wealth inequality and intergenerational links. *Review of Economic Studies*, 71(5):743–768.

Elinder, M., Erixson, O., and Ohlsson, H. (2012). The impact of inheritances on heirs' labor and capital income. *B.E. Journal of Economic Analysis & Policy*, 12(1).

References III

Gelber, A., Moore, T. J., and Strand, A. (2017). The effect of disability insurance payments on beneficiaries' earnings. *American Economic Journal: Economic Policy*, 9(3):229–261.

Golosov, M., Graber, M., Mogstad, M., and Novgorodsky, D. (2024). How Americans respond to idiosyncratic and exogenous changes in household wealth and unearned income. *Quarterly Journal of Economics*, 139(2):1321–1395.

Holtz-Eakin, D., Joulfaian, D., and Rosen, H. S. (1993). The Carnegie conjecture: Some empirical evidence. *Quarterly Journal of Economics*, 108(2):413–435.

Imbens, G. W., Rubin, D. B., and Sacerdote, B. I. (2001). Estimating the effect of unearned income on labor earnings, savings, and consumption: Evidence from a survey of lottery players. *American Economic Review*, 91(4):778–794.

Joulfaian, D. and Wilhelm, M. O. (1994). Inheritance and labor supply. *Journal of Human Resources*, 29(4):1205–1234.

References IV

Kindermann, F., Mayr, L., and Sachs, D. (2020). Inheritance taxation and wealth effects on the labor supply of heirs. *Journal of Public Economics*, 191:104–127.

Kopczuk, W. (2013). Incentive effects of inheritances and optimal estate taxation. *American Economic Review: Papers & Proceedings*, 103(3):472–477.

Nekoei, A. and Seim, D. (2023). How do inheritances shape wealth inequality? Theory and evidence from Sweden. *Review of Economic Studies*, 90:463–498.

Nishiyama, S. (2002). Bequests, inte vivos transfers, and wealth distribution. *Review of Economic Dynamics*, 5(4):892–931.

Picchio, M., Suetens, S., and van Ours, J. C. (2018). Labour supply effects of winning a lottery. *Economic Journal*, 128:1700–1729.

Poterba, J. (2000). Stock market wealth and consumption. *Journal of Economic Perspectives*, 14(2):99–118.

References V

UBS (2024). Billionaire ambitions report 2024. Technical report, UBS, Zurich.

Vollset, S. E. et al. (2024). Burden of disease scenarios for 204 countries and territories, 2022–2050. *The Lancet*, 403(10440):2204–2256.

Existing Estimates of the "Carnegie Elasticity"

Effect on subsequent annual earnings of a one-dollar **lottery win**:

- Imbens et al. (2001): **-0.011** (Massachusetts)
- Picchio et al. (2018): **-0.046** (Netherlands)
- Cesarini et al. (2017): **-0.016** (Sweden)
- Golosov et al. (2024): **-0.024** (United States)

Negative average earnings effects also found with respect to:

- Inheritances (Holtz-Eakin et al., 1993; Joulfaian and Wilhelm, 1994; Brown et al., 2010; Elinder et al., 2012; Bø et al., 2019)
- Asset price appreciations (Poterba, 2000; Andersen et al., 2024)
- Social security benefit increases (Gelber et al., 2017)

back

Present-Value Adjustment

- Standardize amounts to properly compare amounts received at different ages
  - Recipients earn interest over varying durations
- Adjust nominal wealth shocks $\mathcal{W}_i$ based on the time available for it to grow
  - Fixed end age = 90
  - $r = 3\%$

$$\mathcal{W}_i^{pv} = \mathcal{W}_i(1 + 0.03)^{[90-a(i)]} \tag{3}$$

Note: shocks are net of tax (inheritance tax anyway negligible)

Back

Linking Structural and Empirical Elasticities

$$\xi_a^{struct} \approx \xi_a^{impact} - \frac{\kappa \lambda_i \mathcal{W}_{i,a}}{\Gamma_{a-1}(1+r)\mathcal{Y}_{i,a-1}^{ns} \log \mathcal{W}_{i,a}}$$

- Quantifies role of anticipation
- Depends on:
  - Preference for leisure: κ
  - Marginal utility of wealth: λ_i
  - Discounting: Γ_{a-1}
  - Interest rate: r
  - Size of wealth shock

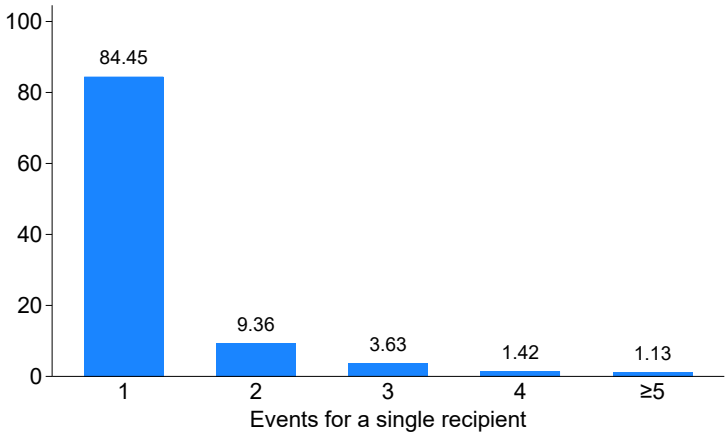
back

Summary Statistics

	Heirs		Lottery winners	
	Mean	SD	Mean	SD
Wealth shock (CHF, p.v. adj.)	349,703	2,335,501	352,662	3,256,443
Wealth shock (CHF, nominal)	129,038	699,576	123,261	1,128,965
Age	57.6	11.5	50.8	12.1
Female	0.53	0.50	0.46	0.50
Married	0.70	0.45	0.57	0.48
Single	0.30	0.45	0.43	0.48
Has kids <18	0.27	0.42	0.30	0.44
Average earnings (CHF)	43,500	43,121	44,029	35,959
Taxable income (CHF)	38,596	70,201	33,556	42,179
Net wealth (CHF)	303,852	2,662,145	93,886	297,036
N of recipients	135,150		5,340	

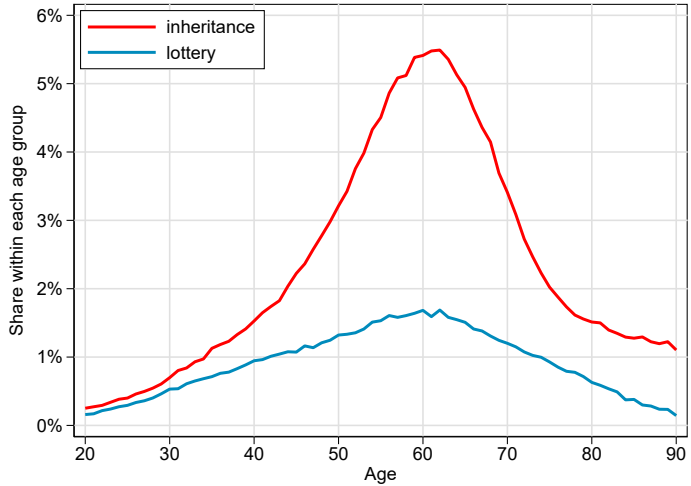
back: data

Frequency of Wealth Transfers



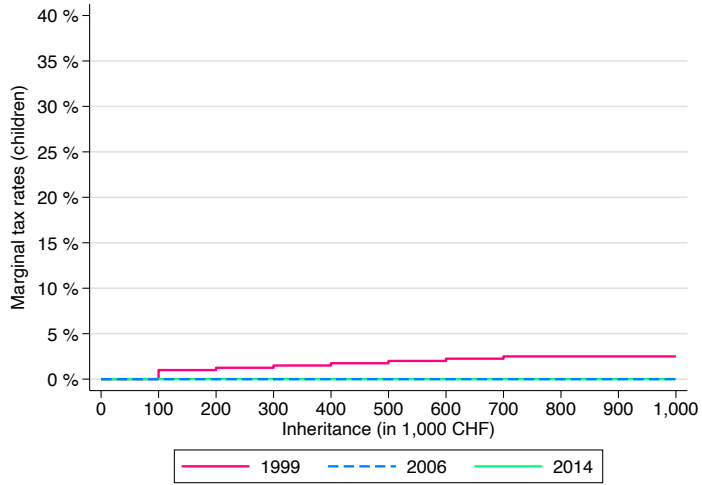
back: data

Age Distribution Inheritances and Lottery Wins



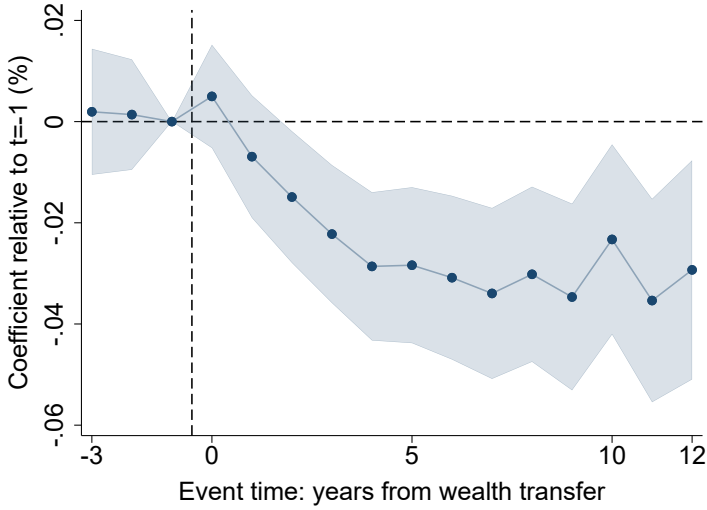
back: data back: results

Inheritance Tax Rates on Direct Descendants, Canton of Bern



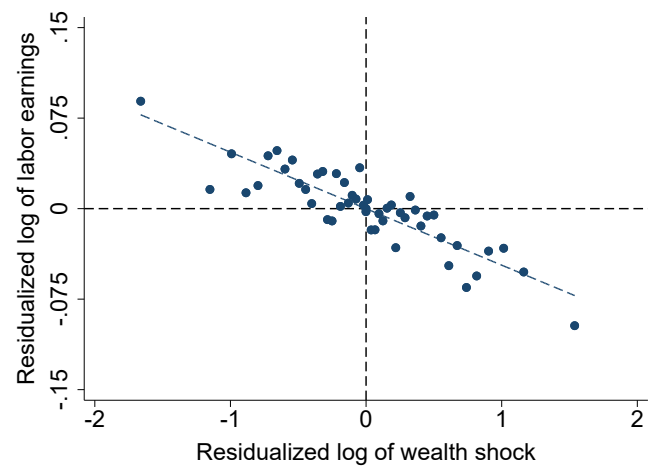
back

Long-run



back

Average Earnings Response to a Wealth Shock: Binned Scatter Plot



Back

International Comparison

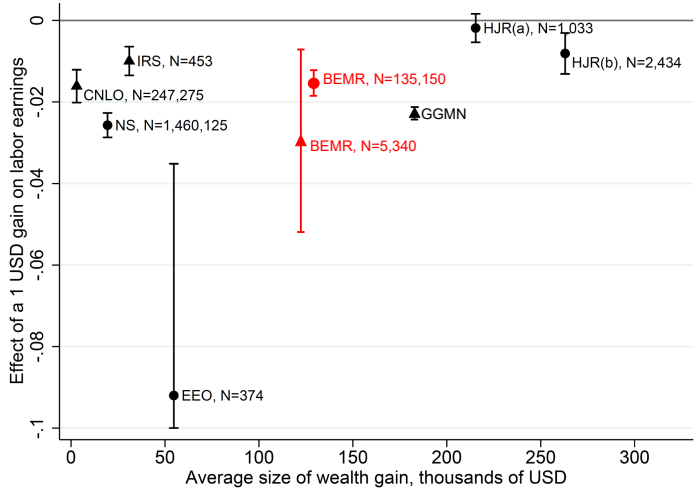


Illustration and elasticity definition taken from Nekoei and Seim (2023).

back

Age-specific earnings responses to wealth shocks: All shocks

	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	≥70
Earnings elasticity	-0.007	-0.029*	-0.015	-0.019*	-0.061***	-0.092***	-0.083***	0.014	-0.026**
	(0.024)	(0.016)	(0.013)	(0.011)	(0.010)	(0.011)	(0.017)	(0.021)	(0.013)
Obs.	40,306	58,261	84,552	126,285	177,522	223,659	219,347	159,215	208,536
Individuals	4,726	6,705	9,346	13,821	19,506	24,827	24,178	17,461	23,781
Pr(recipient)	0.078	0.102	0.134	0.191	0.269	0.359	0.389	0.323	0.205
Avg. earnings (CHF)	47,230	51,910	55,020	57,470	58,751	57,099	48,735	25,077	4,058
Avg. $\mathcal{W}_i^{pv}$ (CHF)	542,693	527,034	477,772	461,895	397,109	364,231	304,498	262,818	191,458
Avg. $\mathcal{W}_i$ (CHF)	99,248	110,091	115,925	130,680	130,174	137,763	132,871	131,979	133,936
On impact MPE (1k CHF)	-1	-3	-2	-2	-9	-14	-13	1	-1
Lifetime MPE (1k CHF)	-20	-79	-39	-43	-115	-114	-41	-	-

back

Age-specific earnings responses to wealth shocks: Inheritance

	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	≥70
Earnings elasticity	-0.009	-0.026	-0.015	-0.020*	-0.063***	-0.089***	-0.077***	0.016	-0.026**
	(0.024)	(0.016)	(0.013)	(0.011)	(0.010)	(0.011)	(0.017)	(0.021)	(0.013)
Obs.	35,765	52,901	77,955	119,721	170,892	217,461	214,094	155,878	205,665
Individuals	4,198	6,087	8,598	13,084	18,772	24,134	23,586	17,095	23,541
Pr(recipient)	0.069	0.092	0.123	0.181	0.259	0.349	0.380	0.316	0.203
Avg. earnings (CHF)	47,398	51,957	55,366	57,683	58,932	57,289	48,866	25,117	4,064
Avg. $\mathcal{W}_i^{pv}$ (CHF)	585,634	560,842	473,805	464,215	400,107	361,970	304,728	254,623	191,983
Avg. $\mathcal{W}_i$ (CHF)	107,165	117,148	115,196	131,238	131,217	136,825	133,025	127,875	134,365
On impact MPE (1k CHF)	-1	-2	-2	-3	-9	-14	-12	2	-1
Lifetime MPE (1k CHF)	-23	-66	-40	-45	-119	-112	-38	-	-

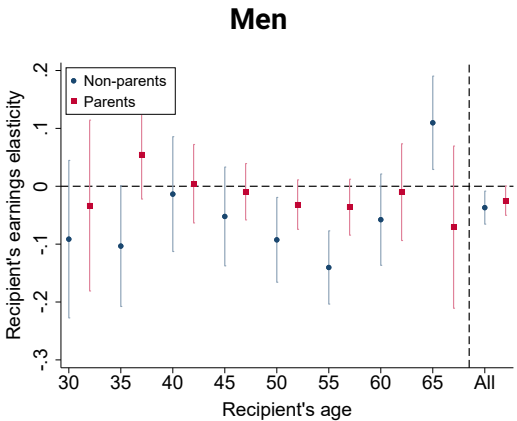
back

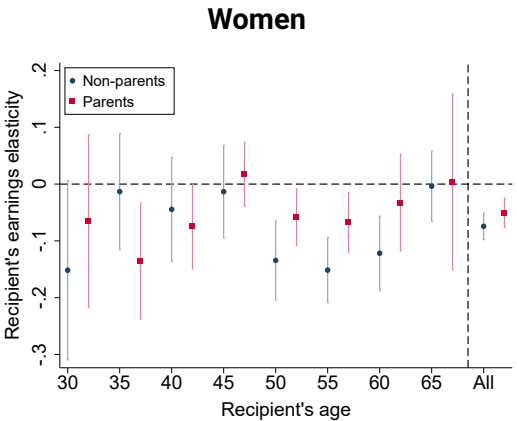
Age-specific earnings responses to wealth shocks: Lottery

	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	≥70
Earnings elasticity	0.020	-0.098	-0.011	0.007	0.022	-0.168**	-0.346***	-0.065	0.018
	(0.114)	(0.062)	(0.047)	(0.072)	(0.060)	(0.076)	(0.129)	(0.158)	(0.126)
Obs.	4,541	5,360	6,597	6,564	6,630	6,198	5,253	3,337	2,871
Individuals	528	618	748	737	734	693	592	366	330
Pr(recipient)	0.009	0.012	0.011	0.010	0.010	0.010	0.009	0.007	0.002
Avg. earnings (CHF)	45,636	51,371	50,110	52,851	53,290	49,225	42,323	23,041	3,671
Avg. $\mathcal{W}_i^{pv}$ (CHF)	133,364	136,176	533,950	411,632	306,656	457,909	293,200	688,998	157,063
Avg. $\mathcal{W}_i$ (CHF)	23,783	28,508	126,253	118,591	98,688	176,643	125,301	345,375	105,808
On impact MPE (1k CHF)	7	-37	-1	1	4	-18	-50	-2	1
Lifetime MPE (1k CHF)	220	-1032	-24	17	50	-146	-156	-	-

back

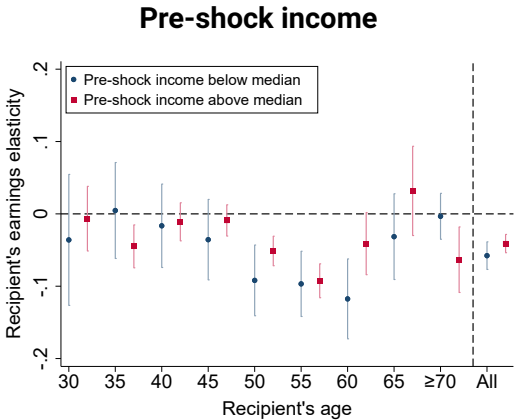
Presence / Absence of Children

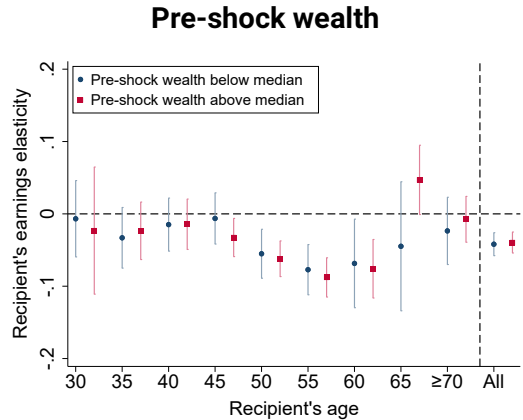




back

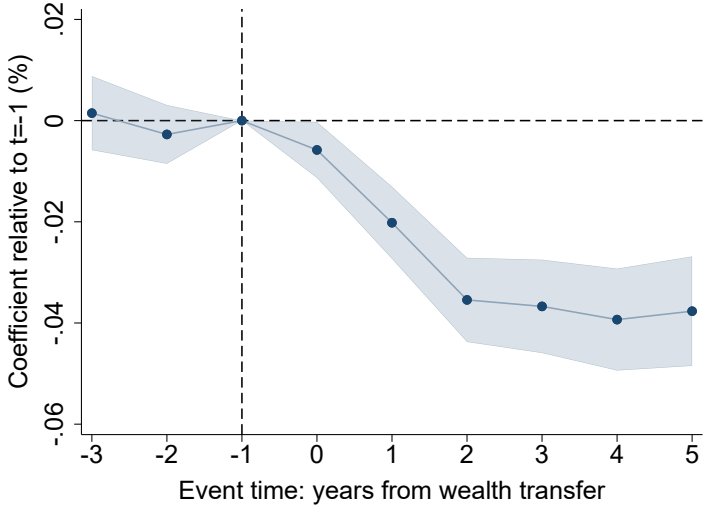
Pre-Shock Income / Wealth Distribution





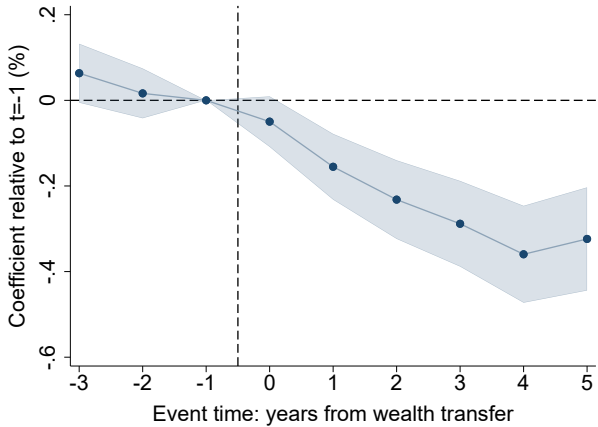
back

Balanced Sample



back

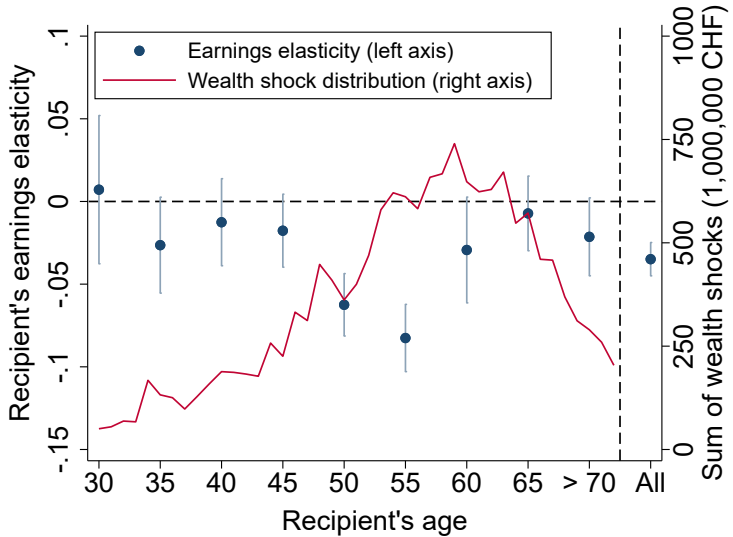
Event Study with Discrete Treatment



Note: Treatment = 5 * avg wealth shock; control = below avg wealth shock.

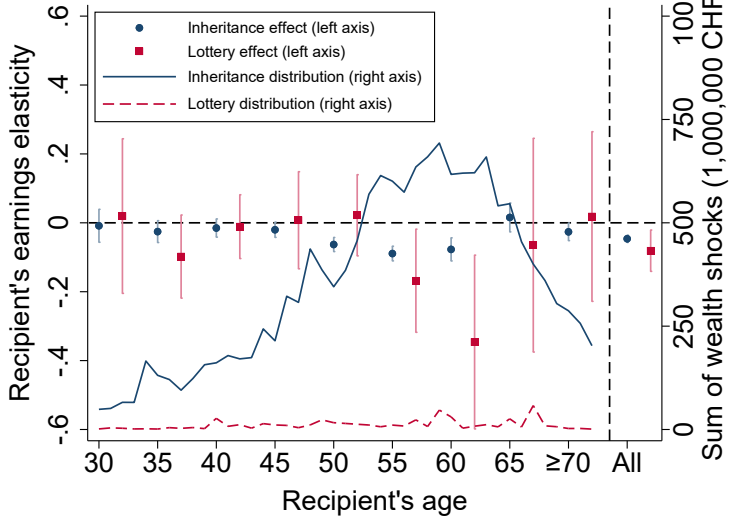
back

Treatment Scaled by Pre-Shock Income



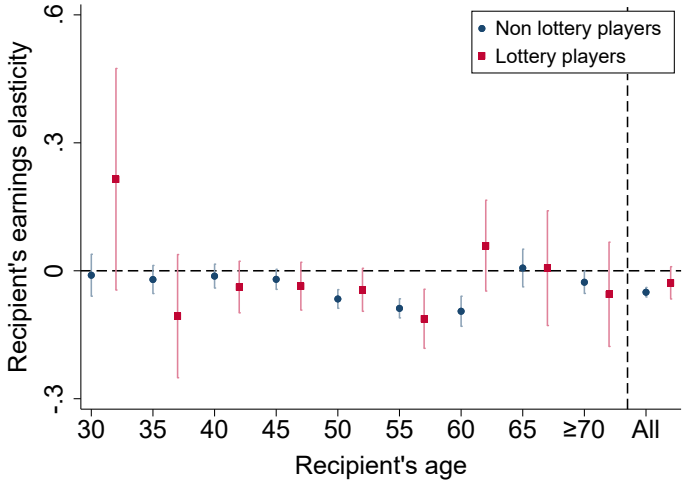
back: main results back: robustness

Response to Lotteries vs. Inheritance by Age



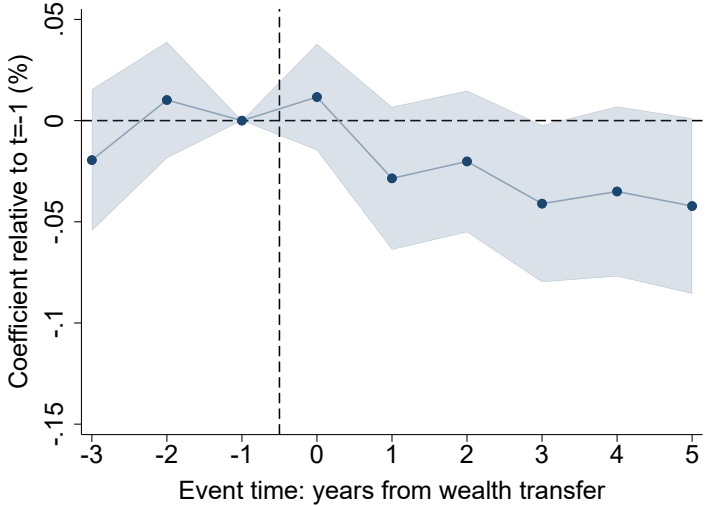
back

Are Lottery Players Different?



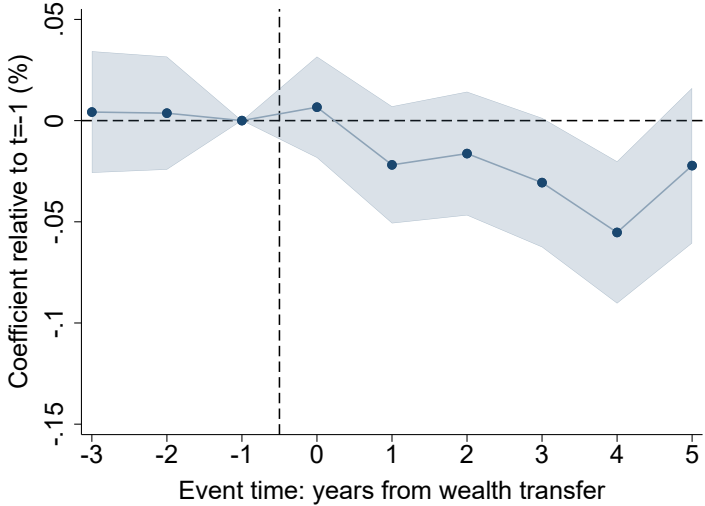
back - main results back - robustness

Event-study Results by Age Group: 30-34



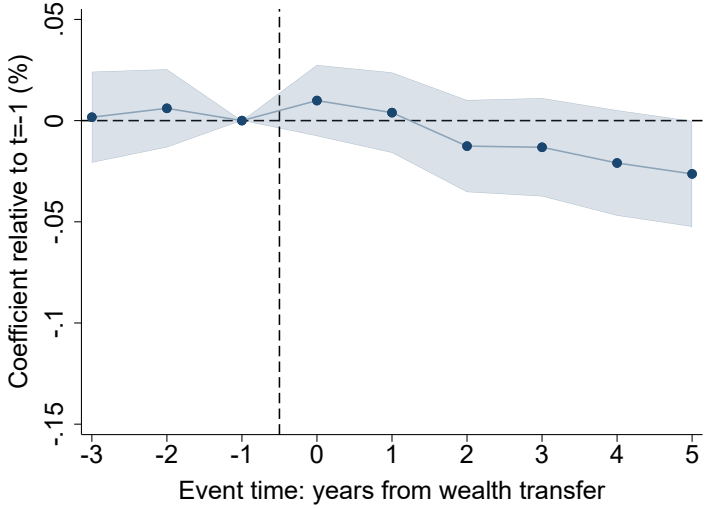
back

Event-study Results by Age Group: 35-39



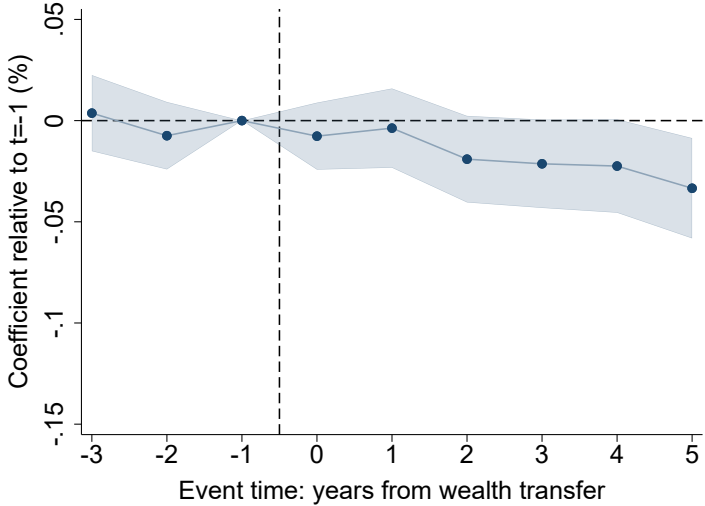
back

Event-study Results by Age Group: 40-44



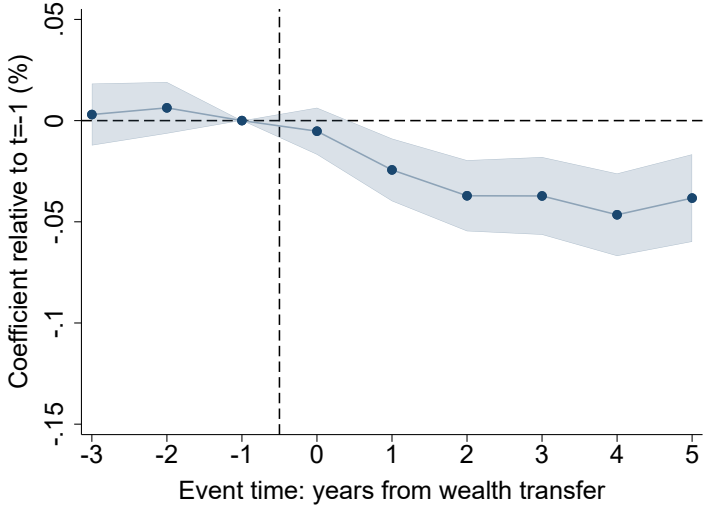
back

Event-study Results by Age Group: 45-49



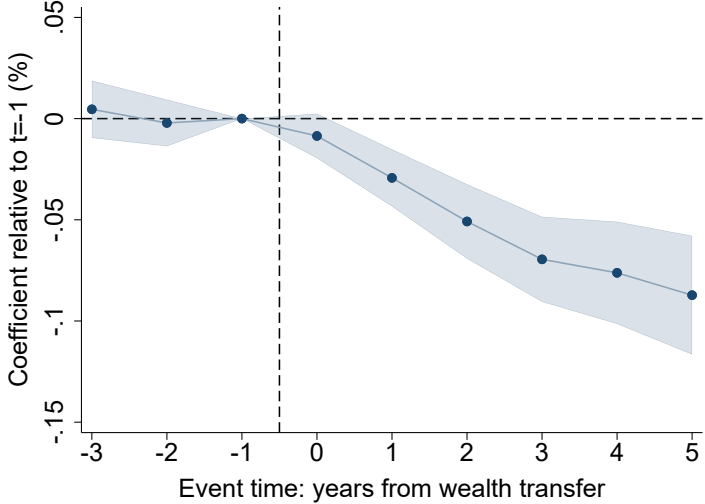
back

Event-study Results by Age Group: 50-54



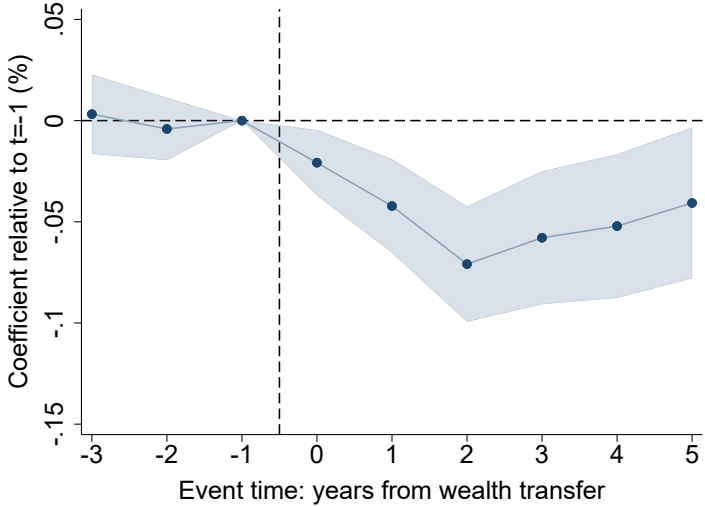
back

Event-study Results by Age Group: 55-59



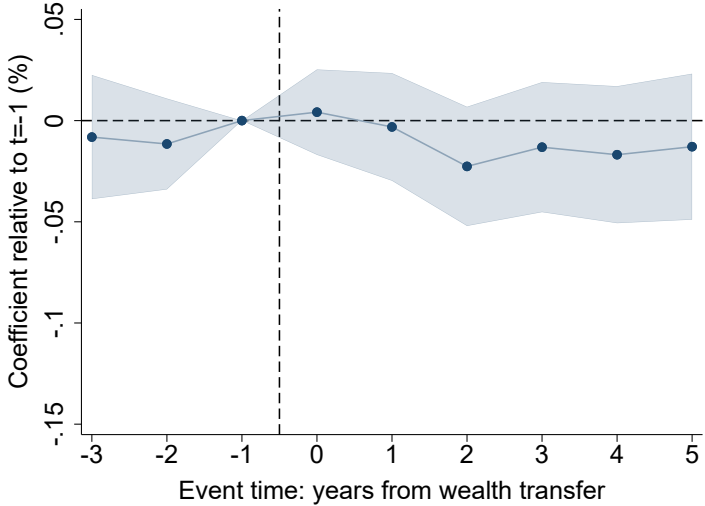
back

Event-study Results by Age Group: 60-64



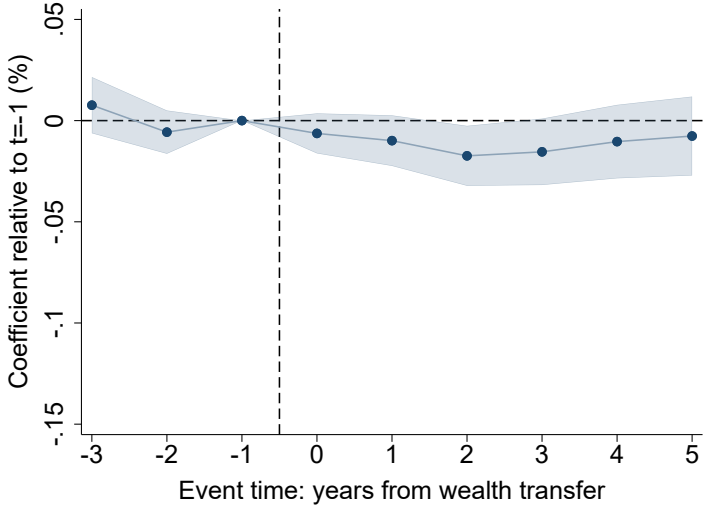
back

Event-study Results by Age Group: 65-69



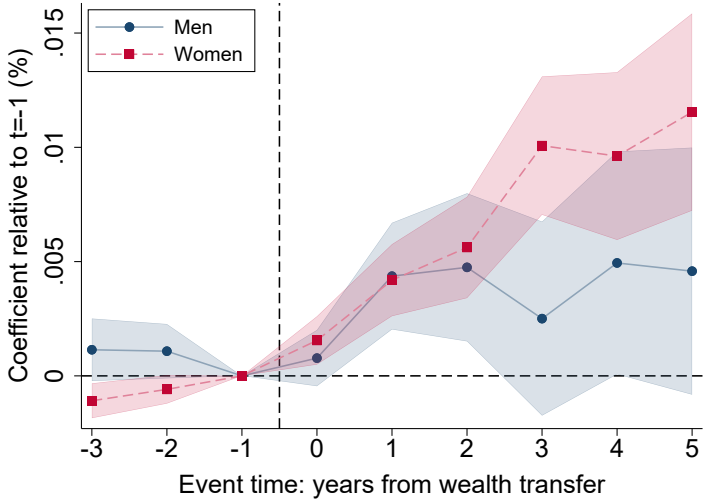
back

Event-study Results by Age Group: 70+



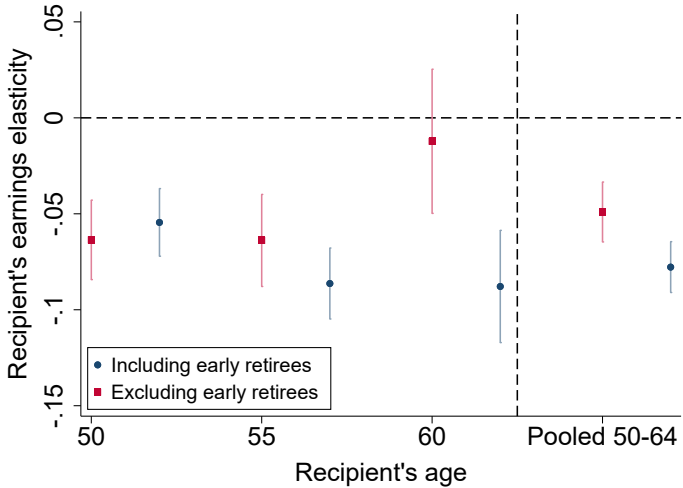
back

Early Retirement by Gender



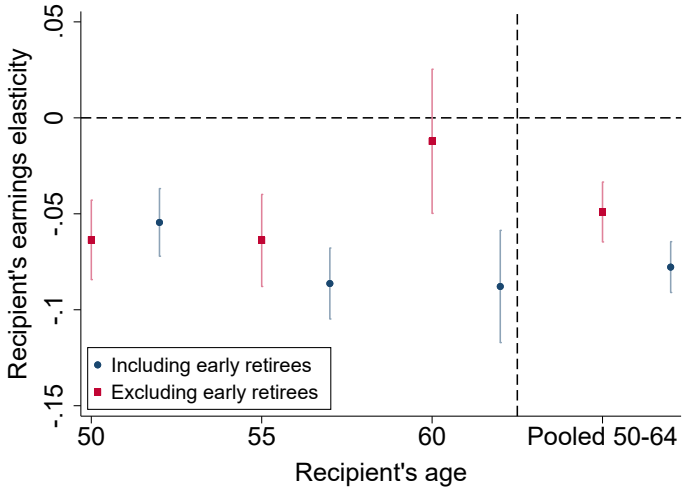
back

Intensive vs. Extensive Responses



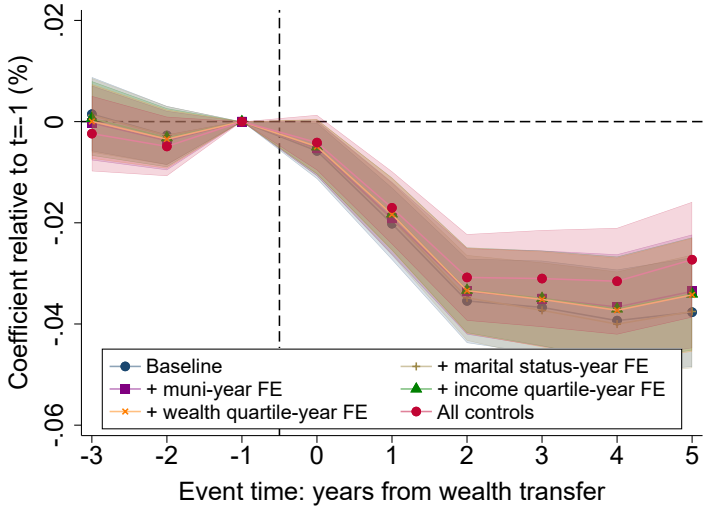
back

Intensive vs. Extensive Responses



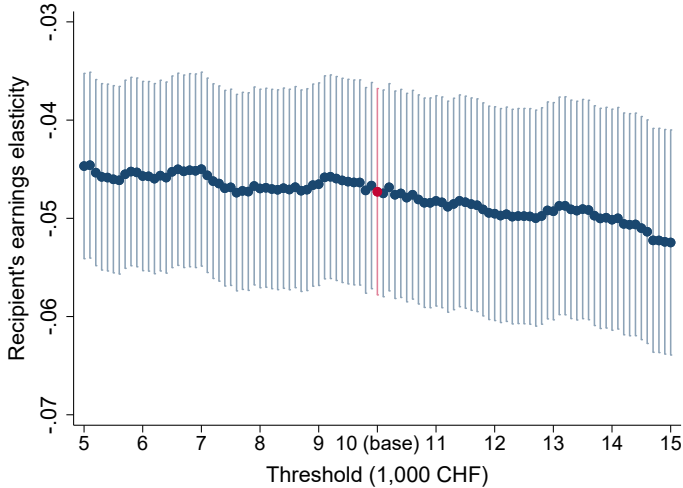
back

Sensitivity to Additional Controls



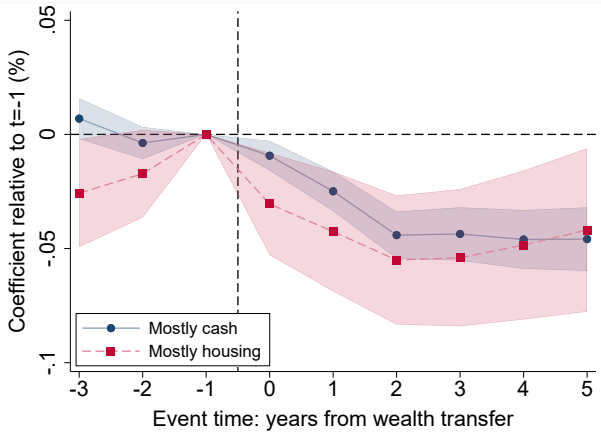
back

Sensitivity to Additional Controls



back

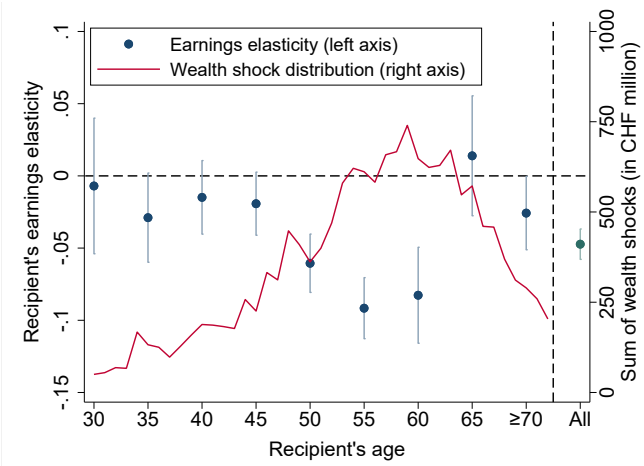
Do liquidity and attachment effects attenuate responses?



Notes: The sample is split into (i) heirs for whom at least 50% of the inheritance value consists of housing wealth ("mostly housing"), and (ii) heirs for whom at least 50% of the inheritance value consists of non-housing wealth ("mostly cash").

back

Age profile of earnings responses: household-level estimates



back

Calibration

Annual interest rate: $r = 3\%$ (data)

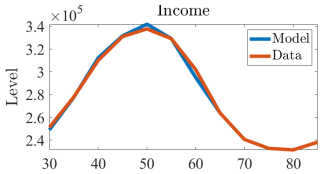
Weight of leisure: $\kappa = 0.35$ (LS elast. of 0.3)

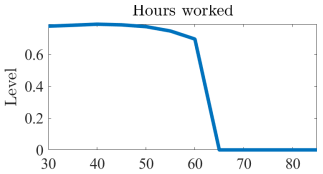
Discount factor ρ: adj. to match life-cycle wealth

Table 1: Calibration

Age	Surv. prob. (s_a)	Income (data)	Hourly wage (inferred)
30 – 34	1	2.51	28.65
35 – 39	1	2.78	31.69
40 – 44	1	3.10	35.35
45 – 49	1	3.31	37.75
50 – 54	1	3.38	39.47
55 – 59	1	3.29	39.41
60 – 64	0.97	3.02	37.88
65 – 69	0.96	2.64	-
70 – 74	0.93	2.41	-
75 – 79	0.89	2.33	-
80 – 84	0.79	2.31	-
85 – 89	0.65	2.38	-

back





Earnings response to expected wealth shocks

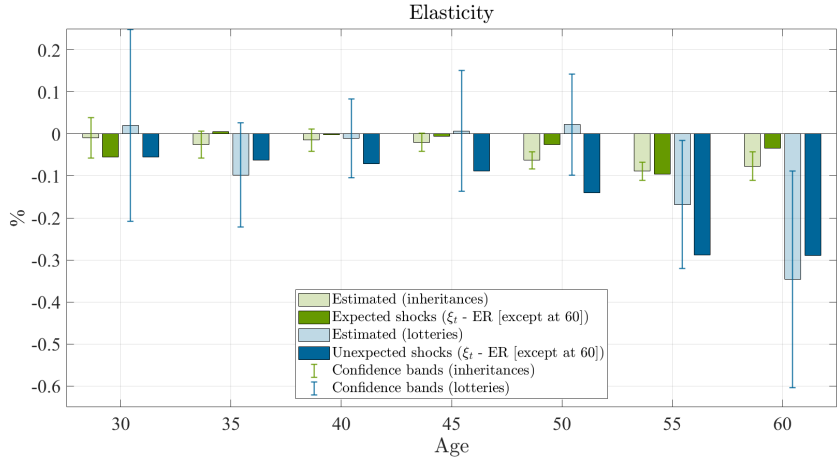
$$\frac{y_{i,a}^{w} - y_{i,a}^{w,ns}}{y_{i,a}^{w,ns}} = -\,\mathbb{E}_a\left[\frac{\kappa\,\lambda_i}{\Gamma_a(1+r)^s}\,\frac{W_{i,a+s}}{y_{i,a}^{w,ns}}\right] \leq 0$$

Determinants

- *Shock size:* Larger wealth shocks $W_{i,a+s}$ (relative to income/permanent income) imply bigger percentage drops in current earnings.
- *Preferences for leisure:* A higher weight on leisure (κ) amplifies the wealth effect on labor supply.
- *Marginal utility of wealth:* A higher λ_i (shadow value of wealth) increases the response.
- *Lifetime discount factor:* A lower Γ_a (which falls with age) raises the response; older individuals react more.
- *Timing and interest rate:* Greater horizon to the expected shock (s) and a higher r attenuate today's response via $(1+r)^s$.

Back

Comparison with Empirical Estimates



Back