The Output Cost of Inheritance: Life-Cycle Earnings Responses to Sudden Wealth*

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Abstract

We study how large, exogenous wealth shocks affect labor supply over the life cycle, and we quantify their aggregate impact. Tracking earnings histories around some 135,000 inheritances and 5,000 lottery wins, we exploit the quasi-random timing and size of these events to identify labor-supply responses with high precision. Earnings responses are negative at all ages but peak between ages 55 and 64, largely due to early retirement. Inheritances generate smaller impact responses than comparable lottery wins, consistent with anticipation effects. Our estimates match the predictions of a life-cycle model with endogenous labor supply and early retirement. Aggregating model-based responses across the population, we find that inheritances reduce economy-wide labor supply by 1.9%–2.6%. The timing, size, and anticipation of inheritance all contribute to shaping its macroeconomic consequences.

Keywords: inheritance, labor supply, lottery wins, life-cycle effects
JEL Classification: J22, D31, D64, G51, H31

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1 Introduction

Inheritance represents one of the largest and fastest-growing flows in modern economies. It amounts to 10–15 percent of national income in advanced countries – more than total spending on public pensions – and cumulatively accounts for over half of private wealth in Western Europe and the United States (Alvaredo et al., 2017). Inheritance is even overtaking entrepreneurship as the leading source of new billionaires (UBS, 2024). The macroeconomic importance of inheritance is thus beyond dispute; less clear is its impact on labor supply, and hence on aggregate output.

Given its sheer scale, inheritance has first-order implications for both equity and efficiency. The equity dimension has been extensively studied through the lens of intergenerational inequality.[1] In this paper, we focus instead on an aspect of the efficiency dimension, by asking how inherited wealth affects the labor supply of recipients, and thus GDP. Are bequests substitutes for or complements to labor income? How do responses to inheritance vary over the life cycle, and how do they aggregate up when weighted by the age distribution of inheritance receipt? As life expectancy rises and heirs get older, is there an efficiency case for encouraging transfers to be made earlier in life?

We answer these questions by combining evidence on earnings responses to different-sized wealth shocks with a calibrated life-cycle model. Using administrative tax records for the universe of taxpayers in the second-largest Swiss canton, we track individual earnings trajectories following 135,150 inheritances and 5,340 non-trivial lottery wins. Their quasi-random timing and size allow us to identify plausibly causal labor-supply responses to those two types of shocks with high precision and within the same population-level dataset.

We find earnings responses to be negative and long-lasting throughout, confirming that income effects dominate irrespective of both the source of wealth shocks and recipient age. Pooled across age categories, the estimated earnings response to inheritance is around half as strong as the response to a comparable lottery win, which confirms the partly-anticipated nature of inheritance. The strongest responses are found for individuals who inherit when aged 55-64 – which also happens to be the modal bracket in the age distribution of total inheritance flows. More than half of the earnings effect in that age category can be attributed to early retirement. The dominance of the 55-64 age category is particularly pronounced among male heirs; for female heirs, we observe similarly strong responses at ages 35-44 as at ages 55-64. Summed across age brackets, female heirs' labor supply responses are around twice as strong as those of male heirs.

We then calibrate a life-cycle model populated by individuals featuring heterogeneous bequest motives based on our Swiss data, to simulate two counterfactual scenarios. In a first exercise, we explore the quantitative implications of taxing some of the inheritance away. We consider a linear tax and abstract from indirect effects through the government budget and responses by bequeathers. In this setting, a 10% tax on all inheritances would increase total labor supply by between 0.13% and 0.25%. The lower bound applies when inheritance is perfectly unexpected, and the upper bound applies when inheritance is perfectly expected and can be costlessly borrowed against. If we switch off inheritance completely and take an earnings re-

[1] See, e.g., Nishiyama (2002), De Nardi (2004), Benhabib et al. (2011), Boserup et al. (2016), Nekoei and Seim (2023), and Black et al. (2025).

sponse at the mid-point of the estimated range, the increase in labor supply would range from 1.2% to 2.6%, which translates into a steady-state increase of GDP between 0.8% and 1.7%. Within the stylized setting of the model and the patterns observed in our data, this is our estimate of the output cost of inheritance.

In a second counterfactual experiment, we shift the age distribution of inheritance flows. With rising life expectancy, heirs are getting older on average, and the age distribution of inheritance receipt is gradually moving towards older cohorts. Policymakers might seek to counteract this trend, e.g., by using the tax code to incentivize inter-vivos giving. This would shift the age distribution towards younger cohorts. Our analysis show that shifts in the age distribution of inheritance towards older cohorts monotonically lower the output cost of inheritance. Trivially, the larger the share of inheritance that accrues to retirees, the smaller will be the scope for labor-supply responses. Less trivially but emerging consistently from our calibrated model, shifting the distribution of inheritance toward younger cohorts would also increase the amounts received by working-age heirs – and not only the time at which they receive, further reducing their labor supply and raising the output cost of inheritance – although quantitatively not by much. Hence, policies aiming to incentivize inter-vivos transfers would come at a cost of lower aggregate work incentives, i.e., a greater output cost of inheritance.

To our knowledge, this is the first study that explores earnings responses to wealth shocks from inheritance and lotteries within the same population. The comparison is interesting because responses to lottery wins can serve as a benchmark for responses to unanticipated shocks, against which we compare responses to inheritance. This allows us to shed light on the unobservable anticipated component of inheritance responses. For this, we draw on a 20-year panel of individual-level administrative records covering the universe of taxpayers in the canton of Bern. We retain only wealth shocks in excess of CHF 10,000 (≈USD 10,000), leaving us with a large sample of wealth shocks of likely consequential size, the average shock corresponding to about three times annual earnings.[2] We can track the earnings histories to those shocks in a total of 1.27 million person-year observations. The size and quality of the dataset allows us to apply a demanding continuous-treatment event-study approach, whereby we identify earnings responses from comparisons among same-age individuals who have experienced different-sized positive wealth shocks in the same calendar year.

Our paper also breaks new ground by using those data to calibrate a life-cycle model, allowing us to perform counterfactual analyses. We develop a life-cycle model with endogenous labor supply, early retirement and heterogeneous bequest motives.[3] The model shows how the impact of a wealth shock can depend on recipient age, the degree of anticipation, and the existence of an early-retirement option. At the intensive margin, predicted earnings responses are negative at all ages, with larger effects for older cohorts. At the extensive margin, wealth shocks can trigger early retirement among those aged 60–65. Unexpected shocks have stronger contemporaneous effects but smaller lifetime effects than anticipated shocks, because anticipated inheritances affect work effort for longer.[4] Inheritance after retirement no longer affects

[2]To be precise, the average inheritance shock corresponds to 3.0 times average earnings of heirs, and the average sample lottery shock corresponds to 2.8 times average earnings of lottery winners (see Appendix Table B1).

[3]Borrowing model features from De Nardi (2004), we adopt a less detailed set-up regarding heterogeneity – in terms of productivity for instance – but focus on endogenous labor supply along the intensive margin (hours worked) and along the extensive margin of early retirement.

[4]In principle, inheritance could also act as a complement to labor supply, e.g., by facilitating professional training or entrepreneurship. Our empirical specifications are flexible enough to allow for such a possibility.

earnings at all, at least to the extent that it is unexpected. We find that the age-profile of earnings elasticities predicted by the calibrated model matches that found in our empirical analysis remarkably well.

Previous literature. Our paper connects to an active literature exploring labor supply responses to positive wealth shocks. Imbens et al. (2001) first turned to lottery wins as plausibly exogenous and observable shocks to "unearned income".[5] They found that annual earnings on average shrank by some 1.1 dollars per 100 dollars won, up to six years after the win, with a stronger response by workers aged 55-65. The survey-based findings of Imbens et al. (2001) have since been confirmed and extended in more comprehensive administrative data by Cesarini et al. (2017), Picchio et al. (2018), Bulman et al. (2022), and Golosov et al. (2024): on average, sudden wealth is consistently found to have an enduring negative effect on individual earnings. Our findings confirm those results.

Lottery wins provide valuable quasi-experimental variation, but they represent a relatively small flow compared to intergenerational wealth transfers.[6] In our data, inheritance is 25 times larger than lottery wins, both in terms of the number of recipients and of total value (see Table 1). Moreover, as pointed out by Kopczuk (2013b), equivalence of inheritance and exogenous income in terms of their effects on labor supply is a "strong assumption" (p. 370). To the best of our knowledge, ours is the first study to subject this assumption to direct scrutiny.

We therefore explore labor supply responses to wealth shocks arising from inheritance, comparing them directly to responses to lottery wins. This analysis builds on a literature that has sought to quantify the "Carnegie conjecture", whereby the prospect and the realization of a large inheritance leads the heir "to live a less useful and less worthy life than he otherwise would" (Andrew Carnegie, cited by Holtz-Eakin et al., 1993). Nekoei and Seim (2023) have explored earnings responses to inheritance, finding them to be somewhat larger than responses to lottery wins estimated elsewhere.[7] We expand on this work by directly comparing responses to different wealth shocks at different points of the life cycle, comparing inheritance shocks to lottery wins within the same population-level panel dataset.

The direct comparison of behavioral responses to different types of wealth shocks can also hold clues to the role of anticipation, emphasized by Kindermann et al. (2020). By calibrating a life-cycle model they conclude that the estimated effects from realized bequests would need to be doubled for an estimate of the total (anticipated + unanticipated) labor supply effect of inheritance. We are able to put this estimate to the test by directly comparing earnings responses to (at least partly anticipated) inheritances with earnings responses to (unanticipated) lottery wins. Moreover, Kindermann et al. (2020) do not consider life-cycle variation in earnings elasticities, and they abstract from early retirement responses. Additionally to what we do, they also consider (ex-post erroneous) anticipation effects by people who end up not inheriting, but

[5]Some researchers have exploited stock-market price fluctuations as sources of exogenous wealth shocks, focusing mainly on consumption responses (e.g., Poterba, 2000; Andersen et al., 2024). There is also evidence on earnings responses to discontinuities in disability insurance payments (Gelber et al., 2017).

[6]Lottery sales in the U.S. totaled USD 108bn in 2022 (NASPL, 2023). Assuming that 60% of gross sales were paid out to winners, total prize money corresponded to some 0.25% of U.S. GDP – a flow almost two orders of magnitude smaller than the estimated volume of bequests (Alvaredo et al., 2017).

[7]Other papers reporting earnings trajectories subsequent to receiving an inheritance include Holtz-Eakin et al. (1993), Joulfaian and Wilhelm (1994), Brown et al. (2010), Elinder et al. (2012), Bø et al. (2019), Niizeki and Hori (2019), Doorley and Pestel (2020), and Druedahl and Martinello (2022). Nekoei and Seim (2023) provide a helpful graphical summary of existing elasticity estimates in their Supplementary Appendix (Figure C.13).

they find such effects to be small.

Our analysis has implications for the taxation of wealth transfers. Kopczuk (2013a) shows that heirs' labor supply responses imply a negative fiscal externality of bequests that pushes for higher bequest tax rates in an optimal-tax model.[8] While it has been pointed out that U.S. tax law does not treat inter-vivos gifts and inheritances equally (e.g., Poterba, 2001; Kopczuk, 2013b), we are not aware of prior work on the labor-supply and output implications from shifts in the age profile of intergenerational wealth transmission.

In addition, we contribute to a literature that explores optimal age-contingent taxation. Lacking empirical evidence on age-specific labor supply elasticities, Weinzierl (2011) had to assume them to be constant.[9] Returning to this topic more recently, Heathcote et al. (2020) similarly observed that "evidence on labor supply elasticities around retirement is scarce" (p. 21). Interestingly, these papers rely on contrasting premises. Weinzierl (2011) emphasizes conjectures made elsewhere whereby "younger workers have more elastic labor supply than prime-age workers". Conversely, Heathcote et al. (2020), citing models that feature on-the-job learning by Best and Kleven (2013) and Stantcheva (2017), consider scenarios with labor-supply elasticities that rise with age. Our empirical findings are consistent with the latter approach.

Finally, our paper adds to a growing literature that exploits Swiss tax data and institutional features to explore issues of broader academic and policy interest (e.g., Eugster and Parchet, 2019; Martínez et al., 2021; Brülhart et al., 2022; Brülhart et al., 2025).

Our paper is organized as follows. Section 2 describes our empirical setting and estimation strategy. Section 3 presents our data-based estimates of earnings responses to different wealth shocks. In Section 4, we develop a simple life-cycle model to show how labor supply responses to a positive wealth shock can depend on recipient age, anticipation effects and early retirement options/decisions. In Section 5, we extend the model to allow for heterogeneous bequest motives, and we simulate the counterfactual scenarios. Section 6 concludes.

2 Data and empirical strategy

2.1 Data

For a fully data-driven approach to the age profile of labor-supply responses, we can draw on administrative tax records that allow us to track individual-level financial histories. We consider wealth shocks in excess of CHF 10,000 ($\approx$ USD 10,000), with the aim of retaining only shocks that are large enough to plausibly affect earnings behavior.[10] We can draw on detailed annual filings by the universe of taxpayers in the Swiss canton of Bern, covering the period 2002-2019.[11]

[8] In the model of optimal inheritance taxation by Piketty and Saez (2013), labor supply is affected only indirectly through the government's budget constraint forcing changes in inheritance tax rates to be offset by changes in labor taxes.

[9] Weinzierl (2011) acknowledges that "one of the most direct reasons for the differentiation of taxation by age would be variation in the elasticity of labor supply with age", but notes that "unfortunately, empirical evidence is sparse" (p. 1515).

[10] Our threshold value of CHF 10,000 corresponds to around one quarter of average annual earnings in the sample (see Appendix Table B1). Reported lottery wins below CHF 10,000 represent 83.3% of the count of lottery wins but only 2.9% of the value of lottery wins in our sample. Inheritances below CHF 10,000 represent 10.5% of the count of reported inheritances but only 0.2% of the value of inheritances. We verified that our results are robust to perturbations of this threshold (see Section 3.2). Appendix Figure B1 shows the distribution of wealth shocks in our data.

[11] Bern is Switzerland's second most populous canton. Its 1 million inhabitants represent 12% of the Swiss population. Bern is representative of the country as a whole insofar as it combines both urban and rural, and German-speaking as well as French-speaking regions. However, Bern has comparatively low per-capita taxable wealth, representing only 8.9% of the Swiss total (Swiss Federal Tax Administration, 2022). For further details on taxation and tax filing in Bern and Switzerland, see Appendix

We define labor earnings as income from employment plus two-thirds of the amount reported as self-employment income.[12] As married taxpayers file jointly, we adapt the dataset by splitting each married couple into two separate records, allowing us to follow individuals over time as they marry, divorce, or become widowed.[13] Wealth and wealth shocks (including inheritances and lottery wins) are reported at the household level. We therefore split them 50-50 between spouses.

Because our goal is to compare wealth received at different ages, we express nominal wealth shocks in "present-value adjusted" terms both in the empirical part and in the simulations. To do this, we adjust the nominal amount received at a given age by the recipient's assumed remaining life time, by converting the amount received into its equivalent value at age 90 with a constant annual return of 3 percent.[14]

We restrict our sample to individuals for whom we observe at least one inheritance or lottery win, explicitly declared as such in the tax data. For those individuals, we model shocks as discrete events, as they turn out to be lumpy and infrequent in the data.[15] When individuals declare more than one such shock, we consider the largest one. We exclude individuals who experience multiple positive wealth shocks if the second-largest shock amounts to at least half the size of the first. This restriction ensures that behavioral responses can be attributed to a well-defined and dominant wealth shock, minimizing contamination from earlier or subsequent shocks.[16] This leaves us with a sample of 135,150 individuals with an inheritance shock, and 5,340 individuals with a lottery shock, for a total of 1.27 million person-year observations. Lottery wins are expressed post-tax.[17] Given the low or zero taxation of inheritances, no such adjustment is applied to those shocks.[18]

Summary statistics are provided in Appendix Table B1. The sample of lottery winners differs from that of inheritance recipients in terms of demographic composition: lottery winners tend to be younger, more likely to be single and to have lower pre-shock wealth.[19] Our data are thus consistent with findings from other countries, whereby the likelihood and size of bequests correlate positively with pre-receipt wealth (e.g., Nekoei and Seim, 2023). Despite these demographic differences, the two samples are remarkably similar in terms of both the nominal size of the wealth shock and average pre-shock earnings. This suggests that, on average, recipients of inheritances and lottery wins face comparable financial incentives at the time of the shock. In our estimations, we will check that any observed behavioral differences between heirs and lottery winners are not due to differences in the underlying populations.

D1.

[12] This adjustment accounts for the fact that reported self-employment income includes both labor and capital components. Using different scaling factors for self-employment income does not change our results, as self-employment income represents a small share of total labor earnings in our data, and the distribution of such income is not systematically correlated with the size or timing of wealth shocks.

[13] Hours worked, however, are not reported, as they are irrelevant for taxation. This means that we cannot disaggregate earnings responses into changes in hours and changes in wages. However, from a GDP or fiscal perspective, the relevant variable is earnings, which we observe accurately.

[14] Formally, for each individual i who receives wealth at age $a(i)$, the nominal wealth shock W_i is transformed into its present-value equivalent W_i^{pv} using the formula: $\mathcal{W}_i^{pv} = \mathcal{W}_i(1+0.03)^{[90-a(i)]}$.

[15] As shown in Appendix Figure B2, 84.4% of sample heirs/winners experience only a single wealth shock within the time window of observation during the period they are observed.

[16] Note that for the purpose of this procedure we also take account of inter-vivos gifts declared by donees and exclude all individuals for whom the largest such gift exceeds half the size of the largest inheritance or lottery win observed in the data.

[17] See Appendix Section D1.2 for details.

[18] See Appendix Section D1.3 for details.

[19] For further details on lottery players, see Appendix Section D2.

2.2 Identification strategy

Our initial empirical approach consists of a difference-in-differences (DiD) research design that compares labor earnings between individuals, before and after receiving the wealth shock. Assume that individual i receives a positive wealth shock (through inheritance or a lottery win) in calendar year t and is assigned to an age cohort $a(i)$ based on her age at the time of the wealth shock.[20]

We define the fact of receiving a wealth shock as "treatment" and its monetary (present-value adjusted) value, $\mathcal{W}_i^{pv}$, as the "treatment dose". Considering the treatment in continuous form offers several advantages over a binary treatment (see e.g. Callaway et al., 2024). Our main motivation is practical: variation in treatment intensity makes it possible to evaluate treatments that lack an evidently suitable control group. Because heirs may differ from non-heirs in ways that are both observable and unobservable, our empirical strategy thus rests on comparing heirs and lottery winners who receive wealth shocks of different sizes but at the same age and in the same calendar year.

We estimate static DiD specifications of the following form:

$$\ln(\mathcal{Y}_{i,t}) = \beta \cdot [Post_{i,t} \cdot \ln(\mathcal{W}_i^{pv})] + \delta_i + \gamma_{t,a(i)} + u_{i,t}, \tag{1}$$

where $\ln(\mathcal{Y}_{i,t})$ are log labor earnings of individual i in calendar year t. δ_i are individual fixed effects, and $\gamma_{t,a(i)}$ are calendar year-by-age fixed effects, with age measured in the year of the wealth shock. We thereby force our identifying variation to come from comparing individuals who not only have the same age, but who also experience the wealth shock in the same calendar year. This addresses the econometric concern that negative weights might affect the computation of treatment effects when the treatment is staggered (see e.g. Goodman-Bacon 2021).[21] We assume that the error term $u_{i,t}$ has mean zero and is uncorrelated with the timing and size of the wealth shock, conditional on fixed effects. Throughout the analysis, we cluster standard errors at the individual level.

Our parameter of interest is β, the earnings elasticity to wealth shocks. Its estimation is based on the interaction between a dummy for the post-treatment period, $Post_{i,t}$, and the size of the present-value adjusted wealth shock, $log(\mathcal{W}_i^{pv})$. The basic assumption for interpreting β as a causal treatment effect is that, conditional on age-by-calendar time and on the fact of being an heir/lottery winner, the *size* of the wealth shock is distributed quasi-randomly. This is equivalent to the "parallel trends assumption" of standard DiD specifications.[22]

To test this assumption, we turn to an event-study design, whereby we denote the year of the wealth shock as $t = 0$, and index time relative to that year. We then study the evolution of earnings as a function of (a) the time distance from the wealth shock and (b) treatment intensity,

[20] Note that for the fixed effects of the empirical model, age is measured in years, not in the five-year brackets used e.g. in the model of Section 4.

[21] In our context, negative weights could arise because β is a weighted sum of several difference-in-differences estimates, each comparing the evolution of the outcome variable between consecutive time periods across pairs of treatment cohorts. Given the staggered timing of the treatment, the "control" group in some comparisons includes individuals that will be treated later. $\gamma_{a(i),t}$ "turns off" the staggered implementation of the treatment, by only comparing individuals who experience heterogeneous wealth shocks at the same time and age.

[22] To further check the validity of this identifying assumption, Section 3.2 presents a series of robustness tests that augment the baseline specification by including additional interactions: calendar-year fixed effects interacted with pre-shock marital status, municipality of residence, pre-shock wealth, and pre-shock income level. These additional fixed effects flexibly control for differential earnings trends across individuals who may differ in key socioeconomic characteristics, ensuring that the identifying variation comes from within-group comparisons of individuals who shared very similar observable pre-shock profiles.

by running specifications of the following form:

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

Here, our coefficients of interest are β_k: the impact of a one-percent increase in the size of the wealth shock on subsequent log earnings. We observe separate effects for each year $k \geq 0$ relative to $k = -1$, allowing us to explore dynamic earnings responses by looking at the pattern of β_k for $k \geq 0$. The presence of pre-trends can be examined by tacking β_k for $k < 0$. In alternative specifications (presented in Section 3.2), we follow Callaway et al. (2024) to rearrange equations (1) and (2) as a binary DiD using higher-dose units as the treated group and lower-dose units as the control group.

3 Empirical findings

3.1 Baseline results

We begin by quantifying the average effect of positive wealth shocks on subsequent earnings, pooled across age groups. We then document differences by type of wealth shock (inheritances vs. lottery wins), and their life-cycle patterns.

Average earnings responses to wealth shocks. As a preliminary and transparent visualization, Figure 1 shows how labor earnings respond to positive wealth shocks, based on our 1.27 million person-year observations. Each dot represents average residual earnings for individuals binned by the size of their (present-value adjusted) wealth shock, after controlling for individual and age-by-year fixed effects. The fitted line corresponds to the elasticity estimate from our main regression (the coefficient β of equation 1). The figure reveals a clear and linear-in-logs negative relationship: larger wealth shocks are associated with larger earnings losses. The log-linear functional form of our baseline specification fits the data well.

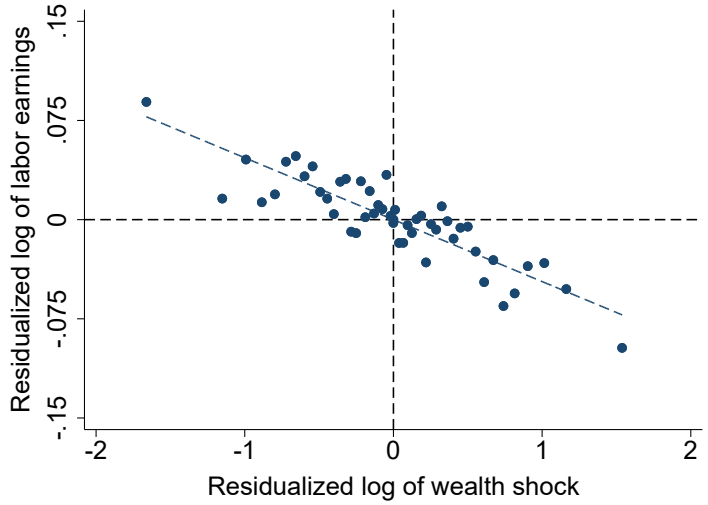
Table 1 presents our estimates of the earnings elasticity to wealth shocks. It reports the estimated coefficient β of equation (1), pooled across all age brackets. Our tightly estimated baseline elasticity of -0.047 (column 1) implies that a CHF 10,000 wealth shock reduces earnings by some CHF 60 annually over the subsequent 5-year period.[23]

Columns (2) and (3) of Table 1 report separate estimates for wealth shocks from inheritance and lotteries. The pooled elasticity of -0.047 turns out to be almost fully driven by inheritance, which is not surprising given that 96% of wealth shocks in our sample are due to inheritance. If we consider only lottery wins, we obtain an elasticity of -0.082 – almost twice as large in absolute value as that associated with inheritance. This difference also has a ready explanation, as it is consistent with the partly anticipated nature of inheritance shocks: while earnings responses to lottery wins materialize in full only after their realization, part of the life-time response to inheritance already predates its arrival.[24] Table 1 also shows how quantitatively

[23] Specifically, this is computed by taking the elasticity estimate and scaling it by the ratio of the average earnings to the average wealth shock for each age group. Multiplying this by 10,000 converts the effect into the earnings reduction associated with a CHF 10,000 wealth shock, allowing for comparability across different age groups.

[24] Playing the lottery could conceivably be endogenous, i.e. when people play the lottery *because* they wish to work less. In that case, earnings of lottery players would be particularly elastic, and the difference compared to heirs could be due to sample selection rather than to anticipation. In one of the robustness checks of Section 3.2, we narrow the inheritance sample to heirs

Figure 1: Earnings responses to positive wealth shocks: binned scatterplot



Notes: This figure provides a graphical representation of the labor earnings elasticity with respect to wealth shocks, including both inheritances and lottery wins. It compares the log of labor earnings (vertical axis) with the interaction of the log of the present-value adjusted wealth shock and the post-treatment dummy (horizontal axis). We depict the residuals obtained by regressing each variable on individual fixed effects and age at the time of the shock-calendar year fixed effects. The figure plots residuals in 50 equal-sized bins and shows the line of best fit, which corresponds to the β estimate obtained from regressing equation (1), estimated over a time interval spanning -3 to 5 years from the wealth shock. The sample contains 1,266,430 person-year observations.

important wealth shocks from inheritance are compared to wealth shocks from lotteries. While average amounts are strikingly similar, at CHF 129,038 for inheritances and CHF 123,261 for lotteries, wealth shocks from inheritances are 26 times more frequent in our data than (non-trivial) wealth shocks from lotteries. Finding substantially smaller responses to inheritances than to comparable lottery wins also runs counter to the hypothesis that labor-supply reductions following inheritance mainly result from grieving.

Figure 2 reports event-study estimates obtained from running equation (2), pooled across all ages and wealth shocks. Our estimates suggest that the average earnings response takes two years to materialize and remains permanent thereafter. In Appendix Figure B3, we estimate the same model but for a post-shock period of up to 12 years. This analysis confirms that, on average, the initial earnings response is not reversed in later years.

Note that our finding of long-lasting drops in earnings do not necessarily mean that households permanently reduce their supply of labor hours, as our observed earnings effect could also result, at least in part, from lasting wage losses due to career interruptions.[25] Our findings are therefore compatible with recipients using positive wealth shocks to finance 'career breaks' that are temporary but have lasting effects on wage progression. Lacking separate information on hours and wages, however, we cannot identify such responses in the data.

Figure 2 also shows that the β_k estimates in the run-up to the shock ($k < 0$) are essentially zero, suggesting that there are no pre-shock earnings trends that could confound the estimated effect. Put differently, the size of the wealth shock does not systematically correlate with earning changes in the years immediately preceding the shock, suggesting that the precise timing

who are also lottery players, and we find that their responses do not differ significantly from those of non-lottery-playing heirs.

[25] This would be consistent e.g. with the finding of Kleven et al. (2019) that the motherhood penalty results from a combination of changes in hours worked, participation, and switching to lower-paying firms. Our model of Section 4 subsumes such effects in adjustments to labor hours. .

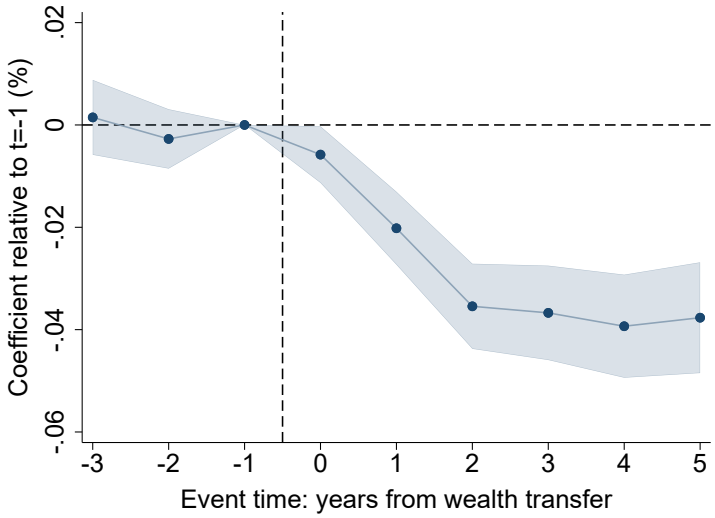
Table 1: Earnings responses to wealth shocks: pooled estimates

	All wealth shocks (1)	Sample: Inheritances (2)	Lottery wins (3)
Earnings elasticity	-0.047***	-0.046***	-0.082***
	(0.005)	(0.005)	(0.031)
Obs.	1,266,430	1,219,122	47,308
Individuals	140,490	135,150	5,340
Average earnings (CHF)	43,517	43,500	44,029
Avg. wealth shock (CHF, p.v. adjusted)	349,798	349,703	352,662
Avg. wealth shock (CHF, nominal)	128,854	129,038	123,261
Effect of a CHF 10,000 wealth shock (CHF)	-58	-57	-102

Notes: This table reports the earnings elasticity to wealth shocks, i.e. estimates of β from equation (1), pooled across age groups. Column (1) considers wealth shocks from inheritance and lottery wins; column (2) focuses only on inheritances; column (3) only on lottery wins. The table also reports information on recipients' average earnings, the average nominal wealth shock, and the average present-value adjusted wealth shock (computed by multiplying the nominal wealth shock by (1+0.03) raised to the power of the number of years from when the wealth is received until age 90: $\mathcal{W}_i^{pv} = \mathcal{W}_i(1+0.03)^{[90-a(i)]}$). "Effect of a CHF 10,000 wealth shock" refers to the average annual earnings loss associated with receiving a wealth shock of CHF 10,000, over the subsequent 5 years after treatment. To compute this, we take the elasticity estimate and scale it by the ratio of the average earnings to the average wealth shock for that age group. Multiplying this by 10,000 converts the effect into the earnings reduction associated with a CHF 10,000 wealth shock, allowing for comparability across different age groups.

and amount of wealth shocks are largely unanticipated even in the case of inheritance.[26]

Figure 2: Event-study estimate of the pooled earnings response



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect of the wealth shock $k \in [-3, 5]$ years from the realization of the shock. Wealth shocks include both inheritances and lottery wins. Standard errors are clustered by individuals. The sample contains 1,266,430 person-year observations.

Age-specific earnings responses to wealth shocks. In Table 2, we decompose the pooled effects of Table 1 into their life-cycle components.[27] We find that all statistically significant esti-

[26] This should, however, not be interpreted as evidence against the existence of anticipation effects over heirs' entire career path up to the arrival of the inheritance. We return to this issue in Section 5.

[27] Appendix Figure B4 shows the age-specific results corresponding to the scatter plot of Figure 1. These graphs exhibit smooth patterns that are clearly downward-sloping and approximately log-linear for individuals aged 50 and above. By contrast, the

mates of earnings responses are negative. For no age group, therefore, do we observe "reverse Carnegie effects", whereby positive wealth shocks would trigger higher subsequent earnings. Most importantly for the purpose of this paper, we find negative earnings responses to be strongest for wealth shocks received at ages 55-64. This pattern applies to wealth shocks from inheritance and, even more starkly, to wealth shocks from lottery wins. Estimated earnings responses to wealth shocks received before age 50 are considerably smaller in magnitude and never statistically significant at the 5% level.

Table 2: Age-specific earnings responses to wealth shocks

	Recipient's age:								
	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	≥70
	a. *Sample*: All wealth shocks								
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
Average 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, p.v. adj.)	542,693	527,034	477,772	461,895	397,109	364,231	304,498	262,818	191,458
Avg. $\mathcal{W}_i$ (CHF, nominal)	99,248	110,091	115,925	130,680	130,174	137,763	132,871	131,979	133,936
Effect of CHF 10k $\mathcal{W}_i^{pv}$	-6	-28	-17	-24	-90	-144	-132	13	-5
	b. *Sample*: Inheritances								
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
Average 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, p.v. adj.)	585,634	560,842	473,805	464,215	400,107	361,970	304,728	254,623	191,983
Avg. $\mathcal{W}_i$ (CHF, nominal)	107,165	117,148	115,196	131,238	131,217	136,825	133,025	127,875	134,365
Effect of CHF 10k $\mathcal{W}_i^{pv}$	-7	-24	-18	-25	-93	-141	-124	15	-6
	c. *Sample*: Lottery wins								
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
Average 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, p.v. adj.)	133,364	136,176	533,950	411,632	306,656	457,909	293,200	688,998	157,063
Avg. $\mathcal{W}_i$ (CHF, nominal)	23,783	28,508	126,253	118,591	98,688	176,643	125,301	345,375	105,808
Effect of CHF 10k $\mathcal{W}_i^{pv}$	67	-370	-10	10	38	-181	-500	-22	4

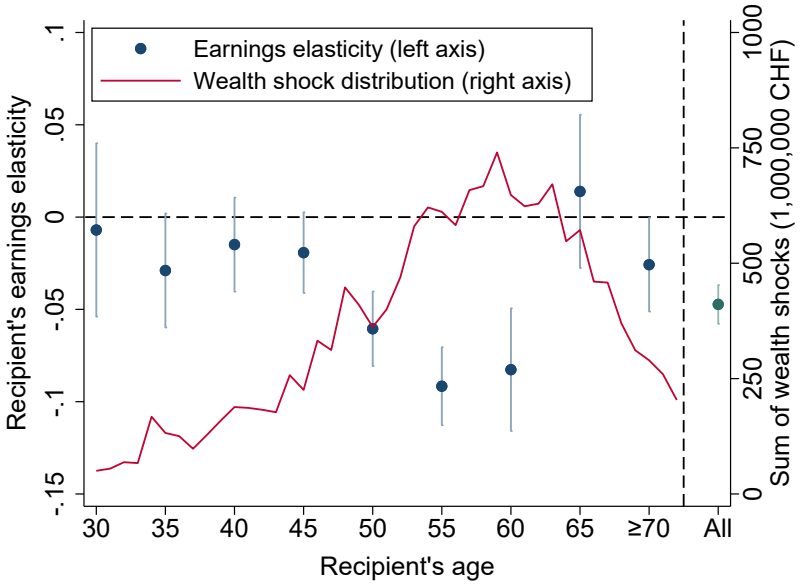
Notes: This table reports the earnings elasticity to wealth shocks, corresponding to the estimated value of β in equation (1), by five-year age group. Panel a focuses on inheritance and lottery wins jointly considered, panel b on inheritances, and panel c on lottery wins. For each panel, we also report the number of individuals (i.e. recipients), the probability of being a recipient, information on recipients' average earnings, the average nominal wealth shock, and the average present-value adjusted wealth shock (computed as: $\mathcal{W}_i^{pv} = \mathcal{W}_i(1+0.03)^{[90-a(i)]}$). "Effect of CHF 10k $\mathcal{W}_i^{pv}$" refers to the average annual earnings loss associated with receiving a wealth shock of CHF 10,000, expressed in CHF and estimated over the subsequent 5 years. To compute this, we take the elasticity estimate and scale it by the ratio of the average earnings to the average wealth shock for that age group. Multiplying this by 10,000 converts the effect into the earnings reduction associated with a CHF 10,000 wealth shock, allowing for comparability across different age groups.

Figure 3 conveys the central message of our empirical analysis. The graph visualizes the

relationship is flat for younger cohorts, consistent with the weaker earnings responses estimated at earlier ages.

elasticity estimates of Table 2, panel a.[28] In addition, we overlay the age distribution of wealth shocks observed in our data (red line). This illustration thereby highlights how labor supply is at its most elastic exactly in the age range that coincides with the bulk of inheritance-driven wealth shocks. As we will show, the estimated age pattern of earnings responses also corresponds closely to that predicted by our life-cycle model of Section 4.[29]

Figure 3: Age profile of earnings responses to wealth shocks



Notes: This figure shows age-specific earnings elasticities to wealth shocks, obtained by estimating the DiD equation (1). Each point reflects the estimated elasticity of log labor earnings with respect to log present-value adjusted wealth shocks, computed separately by age group at the time of receipt (left axis). The estimated values are given in Table 2. The elasticity for "All" corresponds to the pooled estimate across all ages. Each elasticity is estimated over a time interval spanning -3 to 5 years around the realization of the wealth shock. The figure also shows the empirical distribution of wealth transfers (red line; right axis), measured as the sum of wealth shocks received by each age group (in CHF million, pooled over 2002-2019). The sample contains 1,266,430 person-year observations.

In Figure 4, we show the event-study evidence separately by age bracket. Those results are consistent with the life-cycle pattern observed through our DiD estimates, shown in Table 2 and Figure 3. We find no evidence of significant pre-trends in any age group, which supports our interpretation of the post-shock effects as being causal.[30]

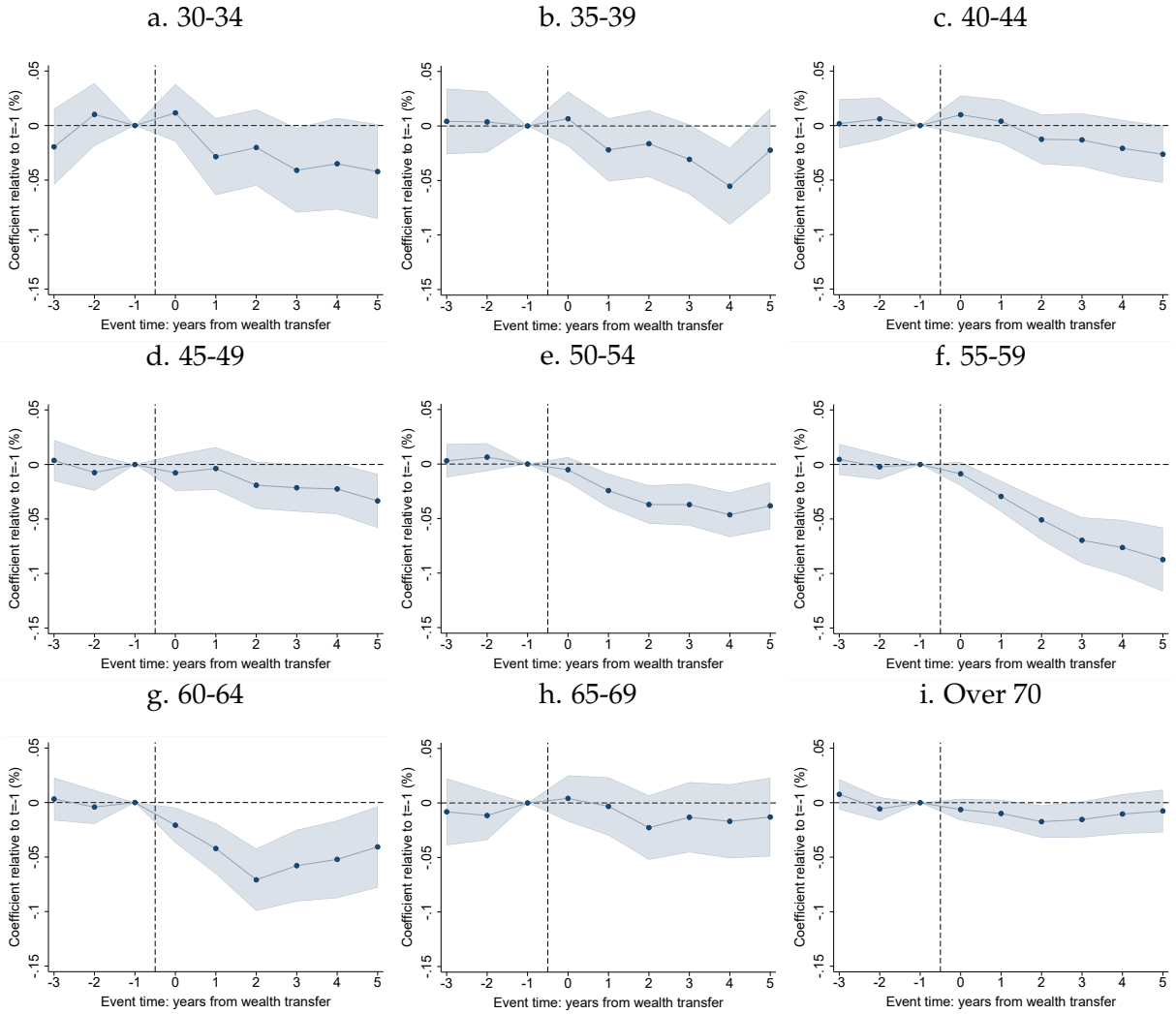
Early retirement. According to our model, labor supply responses late in working life can be amplified when individuals have the option to retire ahead of the statutory retirement age. We can explore this mechanism in our data, by examining how wealth shocks affect the likelihood of early retirement. We define early retirement as the year in which an individual begins drawing a social security or occupational pension, or cashes out pension entitlements before reaching the statutory retirement age (65 for men, 64 for women). To ensure that these events reflect actual (full or partial) workforce exits, we limit the definition to individuals who were active in the labor market during the previous year. Institutional rules preclude formal early retirement before age 58, and we account for the applicable age thresholds across pension types (see Appendix Section D3). Our definition does not require full labor market withdrawal: in-

[28] In Appendix Figure B5, we provide a corresponding illustration of the estimates shown in Panels B and C of Figure 2.

[29] We juxtapose these estimated responses with their theory-derived equivalents in Figure 12.

[30] Appendix Figure B6 replicates this analysis using only inheritance shocks. As expected, given that 96% of our sample wealth shocks result from inheritance, the results are very similar.

Figure 4: Event-study estimates by age group



Notes: This figure shows event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings by age group (based on the year when the wealth shock is received). It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect of the wealth shock $k \in [-3, 5]$ years from the realization of the shock. Wealth shocks include both inheritances and lottery wins. Standard errors are clustered by individuals. For sample sizes, see Table 2.

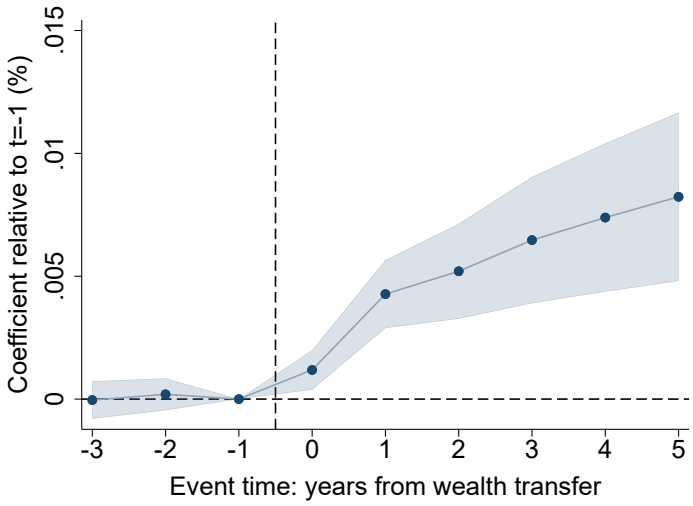
dividuals can still earn income while drawing a pension. What we thus capture are instances of formal and irreversible initiations of retirement.

Figure 5 presents an event-study analysis of the effect of wealth shocks on the probability of early retirement. The figure plots the estimated coefficients of a regression analogous to equation (2), where the outcome is a binary variable set to one if the individual retires early in a given year.

Once again, we find the coefficients for the years prior to the wealth shock to be statistically indistinguishable from zero, indicating the absence of pre-trends. Hence, recipients do not systematically adjust their retirement choices in anticipation of the wealth shock, within the 3-year window preceding it. Second, starting in the year of the shock (event time zero), we observe a statistically significant and increasing trend in the probability of early retirement. This confirms our model's prediction that wealth shocks can induce extensive-margin labor supply reductions via early retirement.

A natural and policy-relevant question is how much of the aggregate observed response

Figure 5: Early retirement responses



Notes: This figure shows event-study estimates of the impact of wealth shocks on the probability of early retirement. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect of the wealth shock $k \in [-3, 5]$ years from the realiziation of the shock. Wealth shocks include both inheritances and lottery wins. Standard errors are clustered by individuals. The earliest possible age to formally retire early is 58. Hence, we consider individuals who receive a wealth shock at ages 55–59. The upper bound of 59 is imposed in order to avoid mechanical effects from retirement at the statutory age (65 for men, 64 for women). The outcome variable is a binary variable equal to one when the individual starts drawing an occupational or public pension, or cashes out pension savings for retirement, conditional on having been labor-market active in the previous year. The positive and significant post-treatment estimates indicate that receiving a wealth shock at an age close to statutory retirement increases the likelihood of early retirement.

is driven by early retirement. We can shed light on this question by comparing earnings responses across subsamples that do and do not include early retirees. To the extent that early retirement is an important mechanism driving observed aggregate responses, omitting early retirees should result in attenuated elasticities, particularly at older working ages. Conversely, if earnings responses were primarily driven by adjustments at the intensive margin, then removing early retirees would leave the age profile largely unchanged.

This is what we show in Figure 6, where we plot a replication the age-specific earnings elasticities of Figure 3, after dropping individuals who retire early within our observation window from the sample (red symbols).[31] It emerges starkly that earnings responses at ages 60–64 are almost entirely driven by early retirement. When early retirees are excluded, the estimated elasticity in this age group drops to essentially zero. In contrast, at ages 55–59, the response is only slightly reduced in magnitude, suggesting that roughly one-fifth of the response in this group is attributable to early retirement, although this is imprecisely estimated. These findings are shaped by institutional features of the Swiss pension system, whereby formal early retirement becomes possible from age 58 onward.[32] Early retirement thus emerges as an important determinant of the aggregate labor supply response to inheritance.

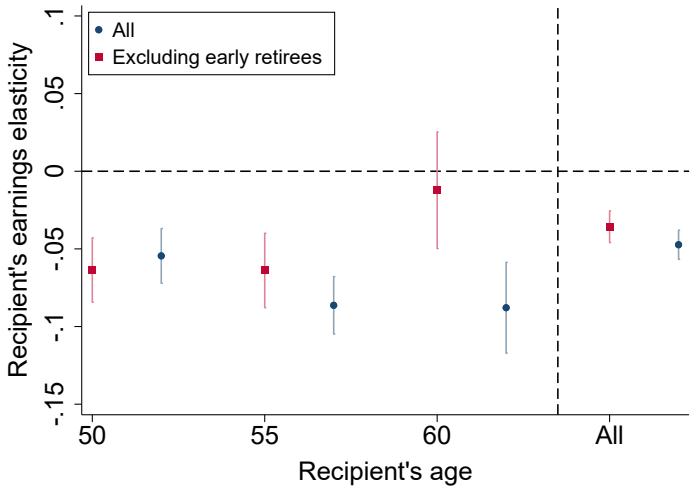
3.2 Robustness

This subsection presents robustness checks along multiple dimensions, including incorporating additional controls, treatment discretization, relative shock size, panel balance, and sample composition, to verify that our main findings are not driven by arbitrary modeling choices or

[31] We restrict our analysis to individuals aged 50 and older, because we cannot observe retirement choices of younger cohorts given the limited time span of our data.

[32] See Appendix Section D3 for details.

Figure 6: Earnings responses with and without early retirees



Notes: This figure shows age-specific earnings elasticities to wealth shocks, obtained by estimating the DiD equation (1). The model is estimated separately for two samples. Blue circles report the age-specific elasticity estimates from the full sample, identical to those shown in Figure 3. Red squares replicate the same estimation procedure but exclude all individuals who eventually retire early within the observation window. Early retirees are defined as individuals who begin drawing an occupational or public pension, or who cash out pension entitlements, before reaching the statutory retirement age (65 for men and 64 for women), provided that they were labor-market active in the preceding year. By comparing the two estimates, we qualitatively assess the role of early retirement in shaping labor supply responses to wealth shocks. We restrict our analysis to individuals aged 50 and older because we cannot observe retirement choices of younger cohorts, given the time span of our data.

sample selection.

Additional controls. To strengthen the credibility of our identification strategy, we re-estimate the event-study specification with additional controls aimed at (i) addressing concerns related to possible confounding shocks correlated with both earnings and the wealth shock; (ii) providing a more refined selection of comparison groups. By including these controls, we ensure that heirs are not only of the same age and treated in the same calendar year (as in our baseline specification), but are also matched more finely on observable characteristics such as pre-shock income, wealth, place of residence, and marital status. Specifically, we sequentially add marital status-by-year fixed effects (to capture life-cycle events that may jointly influence earnings and inheritance timing), municipality-by-year fixed effects (to absorb local labor market shocks or regional heterogeneity), pre-shock income quartile-by-year fixed effects, and pre-shock wealth quartile-by-year fixed effects (to flexibly account for heterogeneous earnings trajectories across the income and wealth distribution). We also estimate a model including all these fixed effects simultaneously. Appendix Figures C1 and C2 show that the estimated dynamic responses remain remarkably similar to our baseline across all specifications.

Sensitivity to varying the CHF 10,000 threshold. To ensure that our results are not driven by the specific threshold used to define economically meaningful wealth shocks, we test the sensitivity of our estimates to alternative cutoffs. In the baseline analysis, we exclude inheritances and lottery wins below CHF 10,000, as such small amounts are unlikely to affect labor supply. To assess robustness, we re-estimate equation (1) using thresholds ranging from CHF 5,000 to CHF 15,000, in increments of CHF 100. As shown in Appendix Figure C3, the resulting elasticity estimates remain remarkably stable and closely aligned with the baseline estimate,

indicating that our findings are not sensitive to the choice of threshold.

Discretizing the treatment. To assess the robustness of our main results, we re-estimate our event-study specification using a discrete treatment definition.[33] Specifically, we classify individuals who receive a wealth shock below the average as the control group, and those who receive a shock larger than five times the average as the treated group. This discrete split allows us to recast the DiD model as a standard binary treatment effect estimation, while preserving the essential logic of comparing recipients of varying treatment intensities. Appendix Figure C4 presents the event-study results using this discrete specification. The dynamic pattern of earnings responses remains virtually unchanged relative to our baseline continuous-treatment model: we find no evidence of differential pre-trends, and a clear and persistent decline in earnings after the wealth shocks.[34]

Rescaling treatment by pre-shock income. A potential concern in our baseline specification is that the labor supply response to wealth shocks might depend not only on the absolute (present-value adjusted) size of the shock, but also on its size relative to the recipient's prior economic position. If higher-income individuals react less to a given wealth shock because it represents a smaller share of their lifetime resources, failing to account for this heterogeneity could bias our estimated elasticities. To address this concern, we perform a robustness test in which we rescale the treatment variable by pre-shock labor earnings, measured as average earnings over the three years preceding the shock. This approach accounts for relative wealth effects and tests whether our findings are driven primarily by variation in shock size relative to prior income. Appendix Figure C8 shows our estimates based on this alternative specification: the pattern of earnings responses remains very similar to that in our main analysis, with the exception of the 60-64 age group. That difference suggests that wealth shocks trigger early retirement especially for high earners (for whom the wealth shocks appear comparatively small when expressed relative to pre-shock income, and the resulting coefficient is thus closer to zero).

Keeping a balanced sample. Another potential concern is that our baseline estimates may be affected by unbalanced panel composition over event time. In particular, if individuals with shorter observed earnings histories (e.g., due to death or migration) differ systematically in their labor supply responses, this could bias our dynamic estimates. For instance, if those most strongly affected by the wealth shock are also more likely to leave the panel early, our estimates of post-shock effects may understate the true earnings response. To address this issue, we re-estimate our event-study model on a balanced sample of individuals whom we observe for at least three years prior to and five years subsequent to the wealth shock. Appendix Figure C9 presents the resulting estimates by age group. The dynamic patterns remain consistent with

[33] For specifications as in equation (1), Callaway et al. (2024) show that β can be expressed as a weighted integral of average treatment effect parameters, with weights integrating zero. In our case, the two-way fixed effects estimator places negative weights on the below-average dose units and positive weights on the above-average dose units. Therefore, after rescaling by a weighted average of the difference between doses for high and low-dose treatments, equation (1) can be expressed as a weighted binary DiD using higher-dose units as the "treated" group and lower-dose units as the "control" group, with weights proportional to a unit's absolute distance from the mean dose.

[34] Moreover, Appendix Figure C5 shows that the consistency of these results holds across all age groups, and separately for different doses (see Appendix Figures C6 and C7). Results are also robust to alternative discrete thresholds.

our baseline findings.[35]

Comparing heirs with lottery players. An important identification concern in our comparison between inheritances and lottery wins is that lottery players may systematically differ from heirs, both in observable and unobservable ways. For example, lottery players might be more risk-seeking, financially constrained, or socioeconomically disadvantaged, which could lead to different labor supply elasticities.[36] If so, our comparison between responses to inheritance and lottery wins might be confounded by differences in recipient characteristics rather than in shock type. To address this concern, we exploit a unique feature of our data: we observe even trivial lottery winnings, which implies that we can identify individuals who play the lottery even if they never win large amounts. We thus restrict our sample to individuals who receive an inheritance and also play the lottery. Appendix Figure C11 presents the age-specific elasticity estimates for this subset. The pattern of earnings responses closely resembles that of our baseline inheritance results. Again, the age group 60-64 turns out to be an exception: at these ages, lottery players do not seem to react significantly to wealth shocks, in contrast to the population as a whole. Overall, our differential findings for (partly anticipated) inheritance shocks and (unanticipated) lottery shocks do not seem to be driven by endogenous selection into playing the lottery, although we cannot comprehensively reject the presence of a selection effect.

Do liquidity and attachment effects attenuate responses? A potential concern is that inheritance and lottery wealth differ not only in the degree to which they are anticipated, but also in their composition. Whereas lottery prizes are typically received as cash, inheritances often include illiquid assets such as housing or, less frequently, family businesses. This difference could attenuate heirs' earnings responses relative to lottery winners, even conditional on age and shock size, because illiquid wealth is harder to monetize and may also carry sentimental value (e.g., a childhood home). To assess whether liquidity differences drive our findings, we classify inheritances into those consisting predominantly of real estate (at least 50% housing wealth) and those consisting predominantly of liquid assets (at least 50% non-housing wealth). We then estimate separate event studies for both groups. Appendix Figure C12 shows that the labor supply responses of heirs to housing- versus cash-dominated inheritances are remarkably similar in both timing and magnitude. This evidence suggests that the smaller responses to inheritance compared to lottery wins are not primarily explained by differences in the nature of the assets received, but rather by the anticipation component inherent to bequests.

3.3 Heterogeneous effects

Here, we briefly document differential responses by gender and by family status. This serves as a plausibility check on our empirical estimates as well as being of interest in its own right.

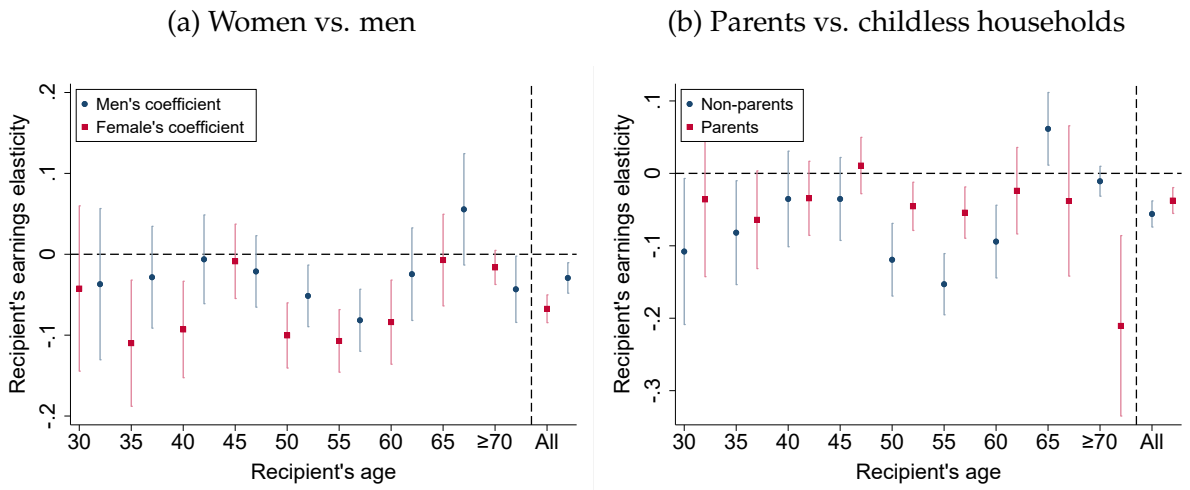
Women and men. In our simple representative-agent model, wealth effects are symmetric across same-aged individuals. However, in the real world, we expect certain household or

[35] Appendix Figure C10 shows event-study estimates by age using the balanced sample. The results again remain remarkably similar to those based on the full sample, confirming that sample imbalance does not drive our findings.

[36] See Table B1 for summary statistics on the subspamples of heirs and lottery winners, and Appendix D2 for background on what is known about lottery players more generally.

demographic characteristics to create heterogeneity. One might for instance expect women – especially those of childbearing age – to show more elastic responses to wealth shocks on average than men.[37] Panel a of Figure 7 shows that women's earnings respond more strongly to wealth shocks than men's in most age groups. The pooled earnings elasticity is roughly twice as large in absolute value for women as for men. In particular, for women the peak response is observed in the 35-39 age group. This is consistent with evidence that the presence of young children increases in particular women's utility of time outside of paid work and thus leads them to have more elastic labor supply with respect to positive wealth shocks.

Figure 7: Earnings responses by gender and presence of children



Notes: This figure compares earnings elasticities to wealth shocks by age, estimated separately for women and men (panel a) and for households with dependent children and households without dependent children (panel b). Each point reflects the estimated elasticity of log labor earnings with respect to log present-value adjusted wealth shocks, computed separately by age group at the time of receipt. The elasticity for "All" corresponds to the pooled estimate across all ages for the respective group. Each elasticity is estimated over a time interval spanning -3 to 5 years around the year of the wealth shock.

Presence/absence of children. Parents of young children face fixed costs of child-rearing (time and money), which raises the marginal value of labor income and reduces the scope to cut labor in response to a wealth shock.[38] Hence, parents might reduce labor supply less for a given wealth shock than non-parents, all else equal. Panel (b) of Figure 7 compares individuals with and without dependent children. It shows that members of childless households are generally more responsive to wealth shocks than parents of young children. This difference is especially pronounced for older parents, in the 50-64 age brackets.[39]

[37] Collective or bargaining models of the household allow the identity of the wealth shock recipient to matter (Chiappori 1988, 1992). Women's traditionally higher flexibility (e.g., part-time work, home production roles) suggests they may exhibit larger labor supply responses, as they can more readily reallocate time to family duties once financial pressure eases (Kleven et al. 2019; Cortés and Pan 2019). Although some previous works have analyzed responses to lottery wins, there is no clear evidence on whether these impacts differ by gender. On the one hand, Cesarini et al. (2017) find no statistically significant differences by gender in labor supply responses to lottery shocks, using data for Sweden. On the other hand, Golosov et al. (2024) find that labor earnings responses to lottery wins tend to be larger for men than for women, using data for the United States.

[38] Models of home production imply that childcare demands make parents' labor supply less elastic: additional wealth may be at least partly dedicated to child consumption rather than to parental leisure (Blundell et al. 2005).

[39] Yet, the pattern reverses at very old ages (above age 70): in this tail of the distribution, parents who still work as well as declaring dependent children exhibit larger wealth responses than non-parents. We interpret this as a selection effect. It is unusual for people above 70 to have minors at home, so those who do are a highly selected group (for example, individuals who delayed parenthood or who must work to support unusually late-age dependents). One interpretation of our finding is that older parents have exceptionally strong income needs, forcing them to keep working – unless they benefit from a positive wealth shock.

4 Wealth shocks and labor supply in a life-cycle model

In this Section, we build a life-cycle model with endogenous labor supply in partial equilibrium for a theory-based prediction of how positive wealth shocks affect labor supply at different times in life. The model features individuals facing age-specific incomes and death probabilities. Those individuals choose at every age how much to consume and to save, and how many labor hours to supply. We start with a simple model and later present extensions allowing for early retirement and bequest motives. We keep the model tractable enough to allow for closed-form solutions regarding consumption and labor supply.

The aim of this modeling exercise is to produce a framework that can be cross-validated with the empirical findings of Section 3 and serve as a basis for counterfactual simulations. Readers more interested in those applications than in the model itself might choose to jump straight to Section 5.

4.1 A simple life-cycle model with labor supply

We follow the literature by considering age brackets a of 5 years (De Nardi, 2004). In the baseline version of the model, we impose mandatory retirement at age $a = T = 65$, and certain death at $a = D = 90$. Retired individuals receive replacement income from age $a = T + 1$ to age $a = D$.

Baseline model. Individuals i of age $a \geq 30$ face a common probability ς_a of being alive next period, with $\varsigma_{D+1} = 0$. Same-age individuals can differ in terms of their wage income $w_{i,a}$. Individual i of age a with accumulated wealth of $b_{a,t-1}$ has the following life-time welfare:

$$V\left(b_{i,a-1}\right) = u\left(c_{i,a}, 1 - h_{i,a}\right) + \left(1+\rho\right)^{-1} \mathbb{E}_a \left\{s_a V\left(b_{i,a}\right)\right\}, \tag{3}$$

where $c_{i,a}$ is consumption, $h_{i,a}$ denotes hours worked, and $\left(1+\rho\right)^{-1}$ is the subjective discount factor. Individuals derive utility from direct consumption $c_{i,a}$, disutility from working a fraction $h_{i,a}$ of their time, and freely carry wealth $b_{i,a}$ from one period to the next.[40] Given our assumptions, lifetime welfare can also be expressed as:

$$V\left(b_{i,0}\right) = \mathbb{E}_0 \left\{ \sum_{a=0}^{D} \frac{\Lambda_a}{\left(1+\rho\right)^a} u\left(c_{i,a}, 1 - h_{i,a}\right) \right\}, \tag{4}$$

where $\Lambda_a = \varsigma_0 \varsigma_1 ... \varsigma_a$ is the survival probability between age 0 and age a. The per-period budget constraint of individual i is then:

$$b_{i,a} + c_{i,a} = \left(1 + r\right) b_{i,a-1} + y_{i,a} + \mathcal{W}_{i,a}, \tag{5}$$

where $b_{i,a}$ is current wealth, r is the exogenous rate of return to wealth, $y_{i,a}$ is *income*, which can derive from work or retirement, and $\mathcal{W}_{i,a}$ an exogenous wealth shock. If $a < T + 1$ (individual's age is below 66), then individual i works and its income is $y_{i,t} = \mathcal{Y}_{i,a} = w_{i,a} h_{i,a}$ which is endogenous since individuals choose $h_{i,a}$. If $a \geq T + 1$, individual i receives an exogenous retirement income $\overline{y}_{i,a}$, implying $y_{i,a} = \overline{y}_{i,a}$.

[40] This also applies to negative wealth, meaning that saving and borrowing are unconstrained.

We consider a log-log utility function, which implies separability between consumption and leisure:

$$u\left(c_{i,a}, 1-h_{i,a}\right) = \log\left(c_{i,a}\right) + \kappa \log\left(1-h_{i,a}\right). \tag{6}$$

In this particular case, Appendix D shows that we can derive closed-form expressions for consumption $c_{i,a}$ and earnings $\mathcal{Y}_{i,a} = w_{i,a}h_{i,a}$:

$$c_{i,a} = \frac{\lambda_i}{\mathbb{E}_a\left\{\Gamma_a\right\}}\mathrm{Y}_{i,a}, \tag{7}$$

$$\mathcal{Y}_{i,a} = w_{i,a} - \frac{\kappa\lambda_i}{\mathbb{E}_a\left\{\Gamma_a\right\}}\mathrm{Y}_{i,a}, \tag{8}$$

where $\mathrm{Y}_{i,a}$ denotes permanent income and λ_i the marginal utility of wealth.[41] Assuming that $\Lambda_a = 1\ \forall a \leq T$, i.e. allowing for death risk only after retirement, and using the definition of Λ_a, the life-time discount factor Γ_a is given by:

$$\Gamma_a = \frac{(1+\kappa)}{\rho}\left(\frac{(1+\rho)^{T-a}-1}{(1+\rho)^{T-a}}\right) + \sum_{s=T-a}^{D}\frac{\mathbb{E}_a\left\{\varsigma_{a+1}\ldots\varsigma_{a+s}\right\}}{(1+\rho)^s}. \tag{9}$$

Equation (9) shows that Γ_a consists of two summands. The first term relates to future working-age periods and captures the labor-supply adjusted life-time discount factor. The second term relates to the future retirement periods and depends on the expected probability of survival. Both terms decline with age – because a increases and because survival probabilities ς_a fall – which implies that the sensitivity of current consumption and current earnings to permanent income $\mathrm{Y}_{i,a}$ increase with age as individuals become more impatient. Further, permanent income is defined as:

$$\mathrm{Y}_{i,a} = \mathbb{E}_a\left[b_{i,a-1} + \sum_{s=0}^{T-a}\frac{w_{i,a+s}}{(1+r)^s} + \sum_{s=T-a}^{D}\frac{\overline{y}_{i,a+s}}{(1+r)^s} + \sum_{s=0}^{D-a}\frac{\mathcal{W}_{i,a+s}}{(1+r)^s}\right], \tag{10}$$

where $b_{i,a-1}$ denotes past-period wealth, the second and third terms respectively capture working-life and retirement permanent income, both evaluated at age t, and the fourth term is the discounted sum of future expected wealth shocks.

Returning to equation (7), we find that the fraction of permanent income consumed every period is not constant, because Γ_a declines with age. Older individuals consume more, as they become more impatient. By implication, any factor that contributes to increasing individuals' permanent income, such as a higher past wealth $b_{i,a-1}$, higher life-time income profiles ($\overline{y}_{i,a}$ or $w_{i,a}$) or unexpected wealth shocks $\mathcal{W}_{i,a}$, will raise current consumption.

Equation (8) shows that earnings are driven both by a substitution effect that leads individuals to supply more hours as the real wage increases, and by a wealth effect that pushes them to work less. The size of the latter effect depends on permanent income $\mathrm{Y}_{i,a}$, on the relative weight of leisure in the utility function κ, on the individual-specific marginal valuation of wealth λ_i and on the age-specific life-time discount factor Γ_a.

[41] More specifically, λ_i is the Lagrange multiplier associated with the life-time/intertemporal budget constraint, and as such captures the additional utility gained from an increase in wealth, reflecting the shadow price of wealth in the individual's optimization problem.

Responses to a wealth shock. Focusing on the change in $\mathcal{Y}_{i,a}$ as a function of potential changes in $\mathcal{W}_{i,a+s}$, the above expressions imply the following percentage change in current earnings in response to an expected wealth shock at age $a+s$ compared to a situation where no shock is received:

$$\frac{\mathcal{Y}_{i,a} - \mathcal{Y}_{i,a}^{ns}}{\mathcal{Y}_{i,a}^{ns}} = -\mathbb{E}_a \left\{ \frac{\kappa \lambda_i}{\Gamma_a (1+r)^s} \frac{\mathcal{W}_{i,a+s}}{\mathcal{Y}_{i,a}^{ns}} \right\} \leq 0. \tag{11}$$

The percentage response of current earnings depends on the size of the initial shock as a percentage of permanent income, and on the elasticity $\frac{\kappa \lambda_i}{\Gamma_a (1+r)^s}$ which itself depends on the individual marginal utility of wealth λ_i, on the age-specific life-time discount factor Γ_a and on the age distance with the expected shock s interacted with the interest rate r. In any case, the intertemporal wealth effect implies a negative response of earnings, the magnitude of which increases with age – as Γ_a falls when individuals get older. The response of earnings in later periods $\Delta \mathcal{Y}_{i,a+s}$, $s > 0$, to a shock hitting at age a not only depends on the size of the initial shock but also on how much of this wealth shock is consumed on impact, by how much earnings drop on impact and therefore how wealth $b_{i,t}$ is affected. We thus need to run simulations to determine how these objects evolve.

Before we turn to the simulations, let us define two important elasticities. The first one, which we label "structural", is the log difference of earnings upon receiving a wealth shock at age a with respect to earnings at age a in a counterfactual situation with no shock at any age (ns):

$$\xi_a^{struct} = \frac{\log \mathcal{Y}_{i,a} - \log \mathcal{Y}_{i,a}^{ns}}{\log \mathcal{W}_{i,a}}. \tag{12}$$

The determinants of this elasticity are analogous to those of equation (11).

A second elasticity concept, which we label "impact", corresponds to what we have estimated in Section 3, looking at the difference between the log change in earnings upon receiving a wealth shock and the counterfactual log change in earnings absent the shock:[42]

$$\xi_a^{impact} = \frac{(\log \mathcal{Y}_{i,a} - \log \mathcal{Y}_{i,a-1}) - (\log \mathcal{Y}_{i,a}^{ns} - \log \mathcal{Y}_{i,a-1}^{ns})}{\log \mathcal{W}_{i,a}}. \tag{13}$$

For wealth shocks that are *unexpected*, these two elasticities are identical, because the shocks cannot affect earnings prior to their realization. In this case, $\mathcal{Y}_{i,a-1} = \mathcal{Y}_{i,a-1}^{ns}$. However, the two elasticities will differ when shocks are *expected*. We shall therefore keep track of the two elasticities along the model simulations.[43] Further, Appendix D shows that the two elasticities are approximately related by:

$$\xi_a^{struct} \approx \xi_a^{impact} - \frac{\kappa \lambda_i \mathcal{W}_{i,a}}{\Gamma_{a-1}(1+r)\mathcal{Y}_{i,a-1}^{ns} \log \mathcal{W}_{i,a}}, \tag{14}$$

which quantifies the difference between the impact and structural elasticities due to anticipation. Knowing in advance that one will receive a wealth shock at age a triggers a response at the time the information is known, which is then incorporated in the dynamics of earnings ahead

[42] Our baseline empirical specification features a continuous treatment variable, but the interpretation of the the resulting elasticity estimate is equivalent, *mutatis mutandis*.

[43] The two elasticities also coincide when expected shocks hit in the first period of individuals' life, which, as in Section 3, we assume to be at age 30.

of the shock. That response is negative and needs to be added to the negative impact response, so that the structural elasticity to expected shocks is larger than the impact elasticity. The size of the anticipated response depends on a number of factors, among which the size of the wealth shock relative to prior earnings ($\mathcal{W}_{i,a}/\mathcal{Y}^{ns}_{i,a-1}$), and on the factors including the preference for leisure (κ), the marginal utility of wealth (λ_i), the age-specific discount factor (Γ_{a-1}), and the interest rate (r).

4.2 Calibration and simulation

We now use the above expressions to derive our objects of interest. For this application, we abstract from the heterogeneity of agents within age cohorts, allowing us to drop the subscript i. We use our dataset (Bern Tax Administration, 2023; see Section 2) to match the average life-cycle income profile y_a and for the age-contingent probability of dying ς_a (WHO, 2023).[44] These data allow us to infer life-cycle profiles of wages w_a (using equation 8), and to compute consumption profiles c_a (using equation 7) and wealth profiles b_a (using equation 5). Our first step consists of computing the life-cycle wage profile w_a that, combined with the endogenous equilibrium life-cycle profile of hours worked h_a, matches the life-cycle profile of labor income observed in the data. In a second step, we make use of the same set of equations to investigate our main research question, i.e. the contemporaneous and life-time effects on earnings of a wealth shock received at a given age.

Calibration. We continue to consider 5-year age cohorts, to abstract from individuals aged below 30, and to assume people who reach their 90th year to die with certainty. The model is thus populated by individuals in age cohorts $a = \{30-34, ..., 85-89\}$. Again following De Nardi (2004), individuals are assumed not to die before age 60, so that $\varsigma_{a<60} = 1$. For age cohorts with $0 \leq \varsigma_a \leq 1$, probabilities of dying are taken from actuarial tables (WHO, 2023). As explained above, we calibrate the life-cycle wage profile such that, in equilibrium, the model matches the life-cycle profile of income taken from the Bern tax data for 2010, which marks the midpoint of our 2002-2019 observation period (see Section 2). The two sets of data inputs are shown in the first two columns of Table 3.

Furthermore, we impose a 3% annual interest rate such that $r = (1+0.03)^5 - 1 = 0.1593$, and we normalize $\lambda_i = 1$.[45] The model is solved and the wage process adjusted (see the last column of Table 3) such that the life-cycle profile of earnings (wages $\times$ hours worked) fits the life-cycle pattern of income. For people over 65, retirement income is calibrated with average incomes observed in our administrative tax data. In the model, the intra-temporal labor supply elasticity is governed by κ, which we set to $\kappa = 0.35$ to yield an average labor-supply elasticity of 0.3, in line with available evidence (see, *e.g.*, Chetty et al., 2011). Finally, we adjust the subjective discount factor $\rho = 0.0725$ for the model to fit the observed life-cycle net wealth profile, again taken from our administrative tax data.

[44] See Section 2 for details on the data used in this paper.

[45] Based on aggregate household balance sheet data for Switzerland between 2002 and 2017 (see https://data.snb.ch/fr/topics/uvo/cube/frsekgevehup), we construct portfolio shares and use data on real asset returns to compute the average return on wealth, which is approximately 3% per year.

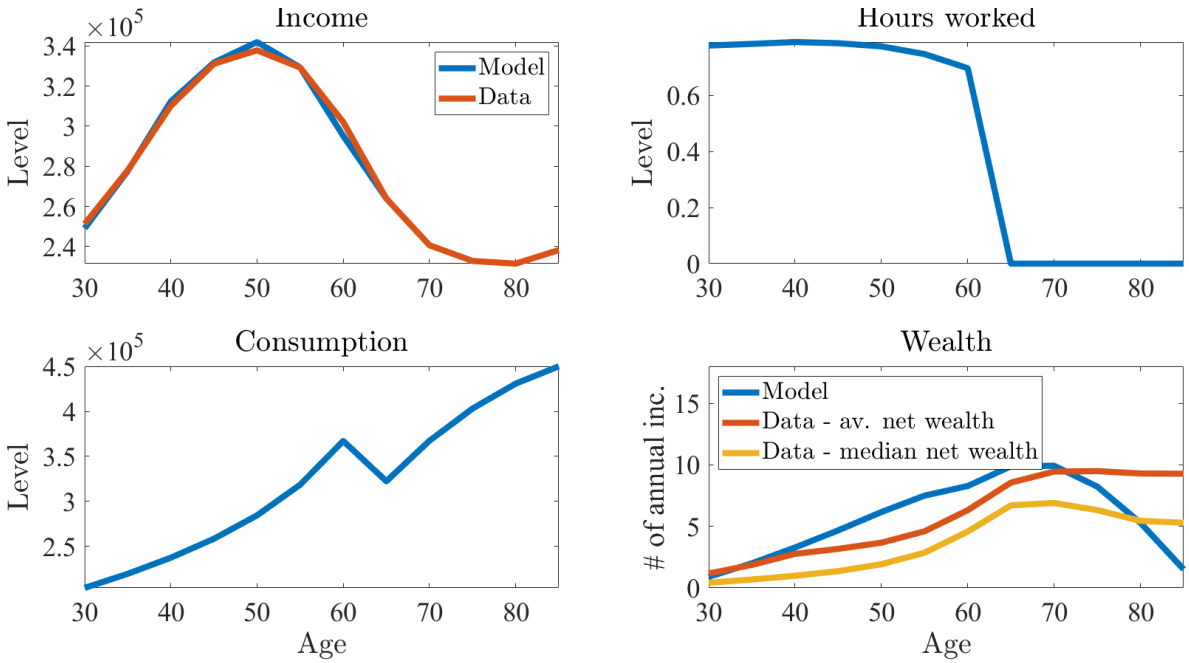
Table 3: Calibration

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	-

Notes: Incomes are reported for 5-year periods and expressed in CHF 100,000. Hourly wages are calculated as total labor earnings divided by total hours (using the avearge of 1,711 hours per worker-year), and expressed in CHF.

Life-cycle profiles. Figure 8 shows life-cycle profiles of earnings, hours worked, consumption and net wealth implied by our calibrated model, and corresponding age-group specific averages observed in our Swiss data for income and wealth.

Figure 8: Life-cycle profiles: model and data



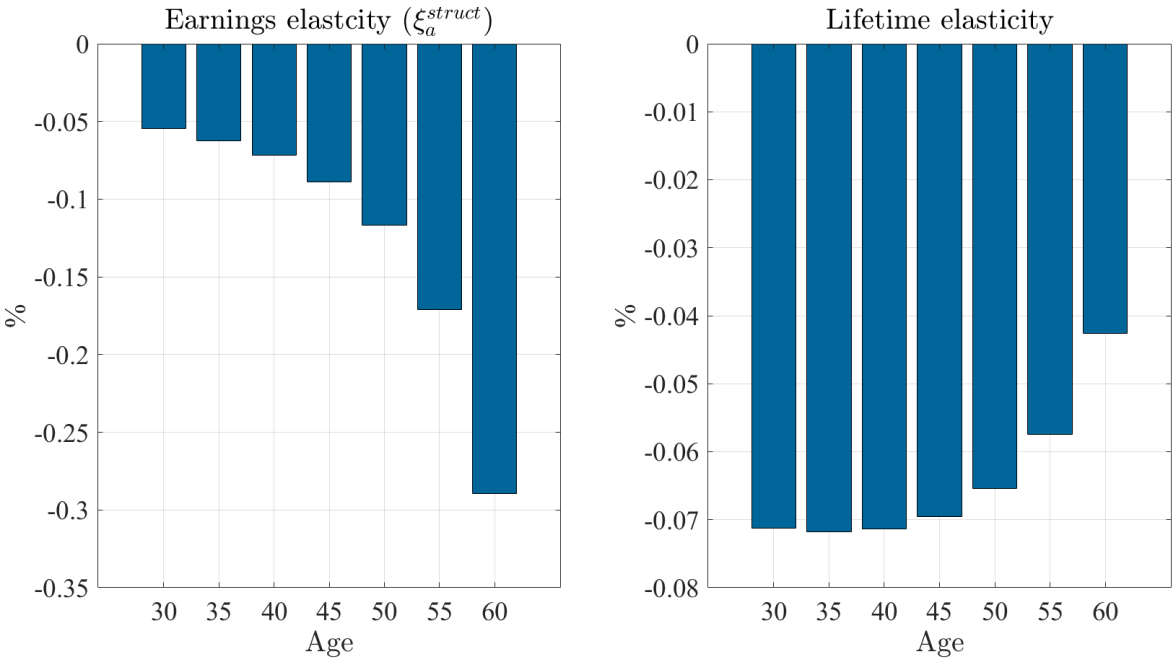
Notes: Based on our calibration, earnings are computed using equation (8), consumption using equation (7), and wealth b_a recursively using equation (5). People who reach their 90th year die with certainty with zero wealth.

We observe the usual hump-shaped life-cycle profile for income, an increasing life-cycle profile for consumption and a non-monotonic pattern for wealth. Note that consumption increases over time because (i) income is increasing until age 50 and (ii) individuals become more 'impatient' after 60 due to probabilities of dying gaining importance with age, which in turn increases the implicit subjective discount rate through a lower Γ_a. Wealth, on the other hand, decreases

after 70. Given the life-cycle pattern of consumption, this implies that people consume part of their wealth towards the end of their active life, and wealth decreasing markedly. Observed wealth depletion after retirement, however, is much less pronounced.[46] Hours worked are stable before 50 and then decline somewhat in the run-up to retirement. This is in line with empirical observation (e.g. Alesina et al., 2005). Hours worked matter insofar as the age-specific elasticity of labor supply directly depends on them: with utility function (6), working more hours is associated with less elastic labor supply, and vice-versa.

Unexpected wealth shocks. Figure 9 reports earnings elasticities implied by unexpected wealth shocks received at different ages (left panel). We normalize the size of these shocks to one year of earnings when hitting at 30, and adjust them to be present-value equivalent when hitting at older ages.[47] The right panel reports the corresponding life-time cumulative effects.

Figure 9: Earnings responses to unexpected wealth shocks



Notes: Based on our calibration. The size of the shock is normalized to represent one year (1/5 period) of the earnings at age 30, and to remain present-value equivalent when hitting at later ages. Impact elasticities are computed as log-deviations of earnings from the steady state divided by the log of the shock. Recall that in the case of unexpected shocks, $\zeta_a^{struct} = \zeta_a^{impact}$. Lifetime elasticities are computed by taking the log-difference in lifetime sums of earnings divided by the log-size of the shock received at 30.

The left panel of Figure 9 shows earnings elasticities with respect to unexpected wealth shocks. The impact response is negative irrespective of the age at which the wealth shock hits, as already shown in the model section, and it increases monotonically with age up until retirement.

In the right panel, we report cumulative responses, i.e. how a wealth shock at age a affect the sequence of earnings at age a, $a+1$ until retirement at $a = T$. In contrast to the effects

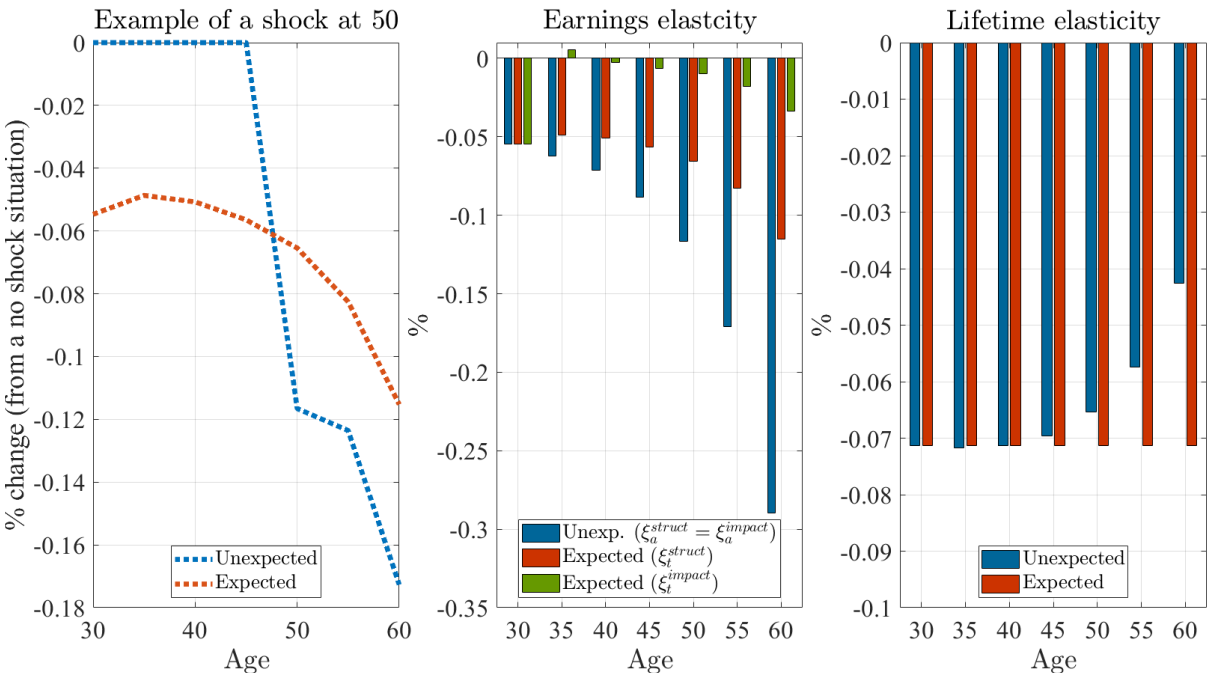
[46] Introducing a non-separable bequest motive could largely reconcile the model with the data. Below we introduce a separable bequest motive to model endogenous early retirement decisions.

[47] Imagine receiving a certain amount at a young age and investing it to earn the market return r. This amount grows over time so that receiving at a later age needs to be adjusted to be intertemporally neutral.

on impact, which increase with age, the cumulative effects turn out to be decreasing with age. This is because even though the earnings elasticity is larger for older individuals, that effect lasts over a shorter remaining work life. The profile of life-time earnings responses is therefore shaped more strongly by the duration effect than by the elasticity on impact.[48]

Expected wealth shocks. Given that inheritance is rarely completely unexpected, we now consider the opposite scenario, whereby the sequence of shocks featured in equation (10) is known at age 30. Because we assume present-value equivalence and costless borrowing, this means that individuals know they will receive at some point in time but the exact timing is irrelevant to the adjustment of their life-time response.[49] Equations (7)-(8) imply that consumption and earnings will react upon receiving the information. Figure 10 shows the impact and cumulative responses of earnings to unexpected and expected shocks. In the case of expected shocks, we need to distinguish between the two elasticity concepts, ζ_a^{struct} and ζ_a^{impact}, to quantify the impact response.

Figure 10: Expected vs. unexpected shocks.



Notes: Based on our calibration. The size of the shock is normalized to represent one year (1/5 period) of earnings at age 30, and to remain present-value equivalent when hitting at later ages. Impact elasticities are computed as log-deviations of earnings divided by the log of the wealth shock. Recall that in the case of unexpected shocks, $\zeta_a^{struct} = \zeta_a^{impact}$. Lifetime elasticities are computed by taking the log-difference in lifetime sums of earnings divided by the log-size of the shock received at 30.

The left panel of Figure 10 shows the example of a wealth shock hitting at 50 and compares the life-cycle responses when the shock is expected or unexpected. If the shock is unexpected, there can be no response before 50, but the impact response of earnings at 50 is strongly negative. In the subsequent periods, earnings decline further because of (a) the cumulative interest income from the additional wealth received at 50, and (b) the rising subjective discount factor

[48] For the elasticity to dominate the duration effect, a considerably larger labor supply elasticity would be needed. In our framework and with our utility function, this would require a much lower level of hours worked and would not be consistent with the life-cycle patterns targeted by our calibration.

[49] We assume frictionless borrowing and lending. Hence, knowing in advance that they will inherit leads agents to borrow and to adjust hours and consumption immediately, as they can repay at no further cost once the shock is realized.

when individuals get older. If the shock hitting at 50 is expected, however, individuals reduce earnings over their entire life cycle, including at ages below 50. Two things are worth noting. First, even when shocks are expected, changes in labor supply are not identical across ages since individuals do not value leisure vs. consumption equally over the life cycle. Second, the size of the "correction" term discussed below equation (14) is captured by the distance between the blue line and the red line at age 50 in the left panel of Figure 10. Its value across ages is also given by the difference between the impact and structural elasticities reported in the middle panel of Figure 10.

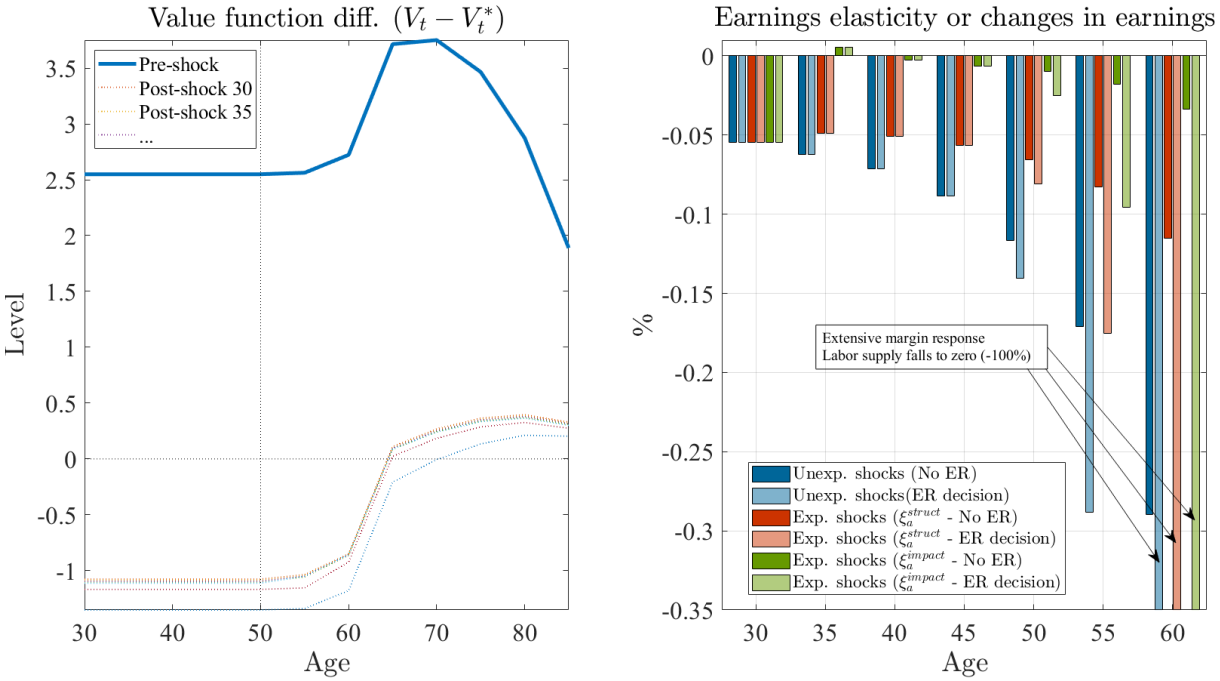
The impact earnings response ζ_a^{impact} (when the shock actually hits) is always smaller if the shock is expected. However, since expected shocks affect earnings over the entire life cycle, the cumulative changes in earnings turn out to be larger than with unexpected shocks. This difference increases in age, as shown in the right panel of Figure 10. The model therefore predicts larger impact effects but smaller cumulative effects from unexpected shocks, such as lottery wins, than from (partly) expected shocks, such as inheritance. Note also the stark difference between ζ_a^{impact} and ζ_a^{struct} in the case of expected shocks. When computing the elasticity with respect to age $a-1$ the observed change in earnings after the realization of the wealth shock, ζ_a^{impact}, is much smaller than the economically relevant elasticity ζ_a^{struct}, since, as the shock was anticipated and could be borrowed against, the entire lifetime path of earnings had already been adjusted prior to the shock.

Early retirement. So far, we have assumed pension income to be available only from age T onward. We now consider a more flexible setting, where individuals are given the option of retiring one 5-year period ahead of the statutory retirement age. By exercising this option, they can enjoy more leisure, at the cost of a permanent penalty to annual retirement income. When making this choice, individuals compare the value functions implied by the two options. In Appendix D, we show that when individuals choose to retire early (ER hereafter), they consume more and supply less labor – and thus accumulate less wealth – already *before* they actually retire. Upon early retirement, they also cut consumption by more than when waiting for the statutory age, which results in larger wealth from 60 to 70, but faster wealth depletion after 70. While facing a permanent income penalty, early retirees enjoy more leisure at age $a = 60$, which then implies that the value of the ER decision is above the value of working until the statutory retirement age whether individuals receive a wealth shock or not. In that case, all individuals choose to retire early, unlike in the extended model with a bequest motive presented below.

Appendix D also shows that the negative response of earnings to wealth shocks hitting at or after 50 is magnified, because individuals supply less labor in the periods preceding retirement when deciding to retire early, which makes their labor supply more elastic between ages 50 and 60. The model thus predicts a *larger* negative response of earnings *at the intensive margin* after 50 to unexpected wealth shocks when individuals retire early than under statutory-age retirement.

Early retirement with a bequest motive. A striking feature of early retirement as shown in Appendix D is that individuals exercising this option end up giving up a lot of their wealth at the end of their lives to smooth lifetime consumption, compared to the case without early retirement. This implication seems unrealistic for at least two reasons. First, wealth can be

Figure 11: An extension with 'warm-glow' bequest motive



Notes for left panel: Difference in value functions for unexpected shocks.
Notes for right panel: The size of the shock is normalized to represent one year (1/5 periods) of earnings at age 30, and present-value equivalent thereafter. Impact elasticities are computed as log-deviations of earnings divided by the log of the shock, with the exception of the elasticity for the age group 60-65 with early retirement. In this case individuals stop working, labor supply falls to zero (100% reduction).

illiquid – e.g., in the form of housing – and therefore unsuitable for consumption smoothing. Second, our baseline calibration implies that early retirees end up with zero or even slightly negative wealth, which is inconsistent with the data (see Figure 8) and indeed with the very existence of wealth shocks from bequests.

In Appendix D, we thus further extend the model with early retirement by introducing a 'warm-glow' bequest motive into utility function, again following De Nardi (2004).[50]

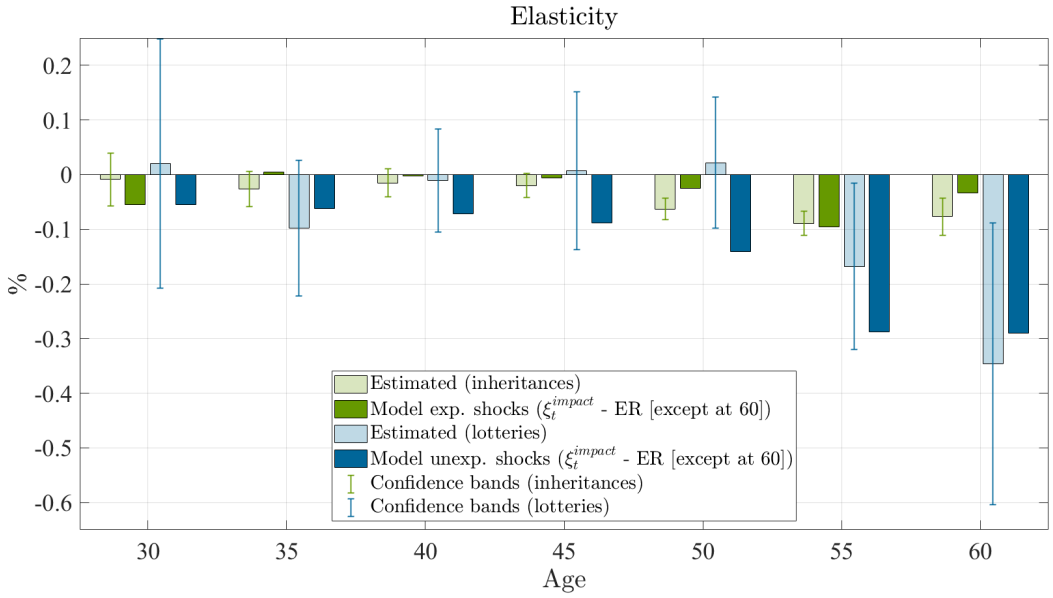
The left panel of Figure 11 traces the difference in value functions $V_t - V_t^*$, with (V_t^*) or without (V_t) the option of retiring early. Earnings responses to unexpected wealth shocks are shown in the right panel. The left panel shows that unexpected wealth shocks shift the decision of individuals towards retiring early *for a given bequest motive*, determined by two utility parameters ω and μ, calibrated for illustrative purposes (see Appendix D). As a result, unexpected wealth shocks now affect earnings not only at the intensive margin – individuals adjusting the number of hours worked before 60 – but also at the extensive margin choosing to retire at 60 (right panel, green bar) *because of* the shock. The right panel of Figure 11 also shows that earnings decrease much more when unexpected wealth shocks trigger early retirement, especially between ages 50 and 60, due to the combined intensive-margin effect (before 60), and extensive-margin effects (at 60).

[50]Given the log-log specification of the utility function, wealth will not affect the marginal utility of consumption of individuals and thus will not directly interact with consumption and savings decisions. Yet, the bequest motive will contribute to shaping the ER decision by altering value functions of the two options – early or statutory-age retirement.

4.3 Taking stock

Our model provides predictions that can be validated by our empirical estimates. Based on closed-form expressions for changes in earnings after unexpected wealth shocks, the model shows that earnings will decrease both on impact and in subsequent periods up until retirement. Based on simulations of the baseline variant and extensions with early retirement, we find that the size of impact responses depends (*i*) on the age of the recipient (older individuals should respond more), (*ii*) on whether shocks are expected (i.e. inheritance) or unexpected (i.e. lottery wins), expected shocks triggering smaller impact responses, and (iii) on the possibility of early retirement, which substantially affects the labor supply elasticity of older workers.

Figure 12: A comparison of estimated and model-based elasticities



Notes: Estimated elasticities and confidence intervals are taken from Table 2. Model-based elasticities ξ_a^{impact} are taken from the case with an early retirement option and wealth in the utility function, except for age 60. In this case the elasticity with an early retirement option is either zero (without wealth in the utility) or infinite (with wealth in the utility), so we consider the elasticity *without* an early retirement option.

We juxtapose the quantitative predictions of the model with our data-derived elasticities in Figure 12. The graph presents the age profiles of labor-supply responses implied by the model with early retirement and a bequest motive (Figure 11) side-by-side with the baseline estimates of Section 3 (panels b and c of Table 2).[51] The correspondence turns out to be strong: our simulation-based predictions are mostly within the 95% confidence bands for the empirical estimates. The one exception is the 50-54 age category, for which the model underpredicts the inheritance response but overpredicts the lottery response.

Figure 12 confirms that our estimated responses to lottery wins are close to the model predictions for unexpected shocks, while our estimated responses to inheritance resemble the model predictions for expected shocks.

[51] For the 60-64 age category, we replace the simulation prediction from the model with early retirement, which is either zero or infinity, with the corresponding value from the model without early retirement and bequest motives (Figure 10).

5 Counterfactual policy experiments

Based on our estimated age-specific elasticities and on the model, we now seek to quantify aggregate earnings responses and to conduct counterfactual policy experiments. For that purpose, we need to introduce heterogeneity into the model to account for the observed heterogeneity in early retirement decisions. In practice, those decisions will be driven by factors such as marital status, family composition or occupation. We represent such idiosyncrasies through a log-normally distributed parameter governing the bequest motive. The details of this extension to the model are given in Appendix Section A3.

5.1 Introducing an inheritance tax

Our first counterfactual experiment is the introduction of a linear tax on inheritances. Keeping our focus squarely on the labor-supply channel, we abstract from any effects the associated tax revenue will generate on the expenditure side, as well as from behavioral responses other than heirs' labor supply. The sole implication of the tax will thus be to reduce the size of amounts received by heirs.[52] This will raise earnings by pushing recipients to supply more labor, both at the age at which they receive lower amounts and throughout their lifetime.

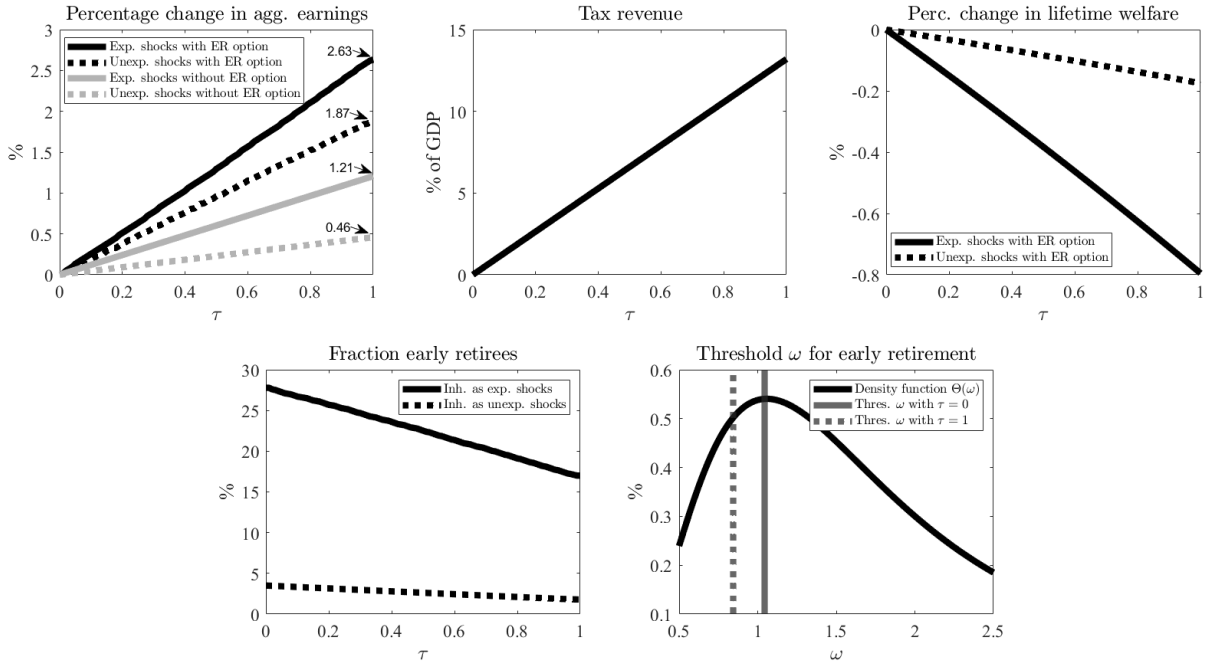
In the model, we allow for changes both at the intensive margin and, where we allow for early retirement, at the extensive margin. Starting from a zero-tax benchmark, Figure 13 reports the percentage change in aggregate earnings implied by different tax rates τ in scenarios with inherited wealth shocks based on average amounts received at different ages taken from the data. Wealth shocks can be treated as expected (solid lines) or as unexpected (dotted lines), and we allow for an endogenous early retirement decision (black lines) or not (gray lines). Our baseline is the case where inheritance shocks are expected and where we allow for an early retirement decision (solid black line), a case that delivers impact elasticities ξ^{impact} that align well with our estimated elasticities (see Figure 12).

We track how changes in inheritance tax rates affect stationary distributions and disregard short-run dynamics. The top left panel reports percentage changes in aggregate earnings from their steady-state values. The top middle panel shows the associated tax revenue, the top-right panel shows changes in lifetime welfare, the bottom left panel shows the share of early retirees in the working-age population, and the bottom right panel shows the displacement of the threshold value for early retirement decisions.

Figure 13 shows how increasing the inheritance tax pushes individuals to work more. In Section 4 we showed that expected wealth shocks have stronger life-time effects than unexpected shocks, while unexpected shocks deliver stronger labor-supply responses on impact. In aggregate terms, the lifetime responses dominate the impact responses, and so reducing the size of wealth shocks leads to a larger increase in labor supply when shocks are expected. In either case, since individuals work more and consume less as the tax is raised, and since we abstract from the use of the tax, the welfare effects of the tax are negative. In the baseline model with perfectly expected shocks, we find that a 50% inheritance tax would increase earnings by 1.3% and decrease welfare by 0.4%. A 100% tax (i.e. complete confiscation of estates) would lead to a 2.6% increase in earnings and a 0.8% decline in lifetime welfare.

[52] When we consider expected shocks, we model the expected amount as being net of the tax, meaning that individuals are assumed to know the tax rate that will apply ahead of the shock.

Figure 13: Effects of an inheritance tax



Notes: Amounts received (nominal), population weights and probabilities of receiving at different ages are taken from Table 2. Baseline model simulations use the model of Section 4 with early retirement and a bequest motive governed by parameters ω and μ. Across all cohorts, ω is distributed as in Figure A2. 'Expected shocks' affect earnings over the entire life-cycle. 'Unexpected shocks' trigger earnings responses on impact and thereafter. 'No ER' is the model in which the early-retirement option is switched off.

If we consider only the model that features an early-retirement option, then confiscation of inheritance through a 100% estate tax increases labor supply by somewhere between 1.9% (if inheritance is completetly unexpected) and 2.6% (if inheritance is perfectly anticipated). Assuming a labor share of 0.65, these numbers would in turn translate into a steady-state increase in GDP of between 1.2% and 1.7%. Within the stylized setting of the model and the structure of our data, this is our estimate of the "output cost of inheritance".

This estimated output cost can be compared to the fiscal externality of inheritance taxation computed by Kindermann et al. (2020). According to their baseline estimate, labor-supply responses imply that every dollar of inheritance tax revenue generates an additional 0.09 dollars of income tax revenue. Taking a representative income tax rate of 35%, our simulated upper-bound labor-supply effect of 2.6% implies that a dollar of inheritance tax revenue generates 0.07 dollars in additional income tax revenue (where $0.05 = 0.35 \times 2.6\% \div 13.2\%$). Our estimate is thus slightly more conservative than that of Kindermann et al. (2020).

To what extent are these effects driven by early retirement? First, note that the early retirement rate declines from 27.7% without a tax to less than 22.5% with a 50% tax and 17% with a 100% tax. So, a maximum of 10% of the age group 60-64 that retire without the tax could reverse their decision and work full time instead. Second, the gray lines in the top-left panel of Figure 13 allow us to quantify the contribution of this mechanism by shutting down extensive margin responses, so that the difference between the black and gray lines can be interpreted as the contribution of the early-retirement margin. Without the early-retirement option, aggregate earnings would increase by 0.6% with a 50% tax and by 1.2% with a 100% tax. This means that,

in the baseline model, early retirement decisions account for roughly half of the total effect, while the other half is attributable to intensive-margin labor supply decisions.

5.2 Shifting the age distribution of inheritance

In a second exercise, we examine how aggregate labor supply responds to changes in the age profile of inheritance receipt. Moving bequests toward younger cohorts provides a simple way of emulating policies that encourage inter-vivos giving. Operationally, we shift the age distribution of inheritance receipt to the left (toward younger individuals) in five-year increments. Conversely, demographic ageing can be interpreted as shifting the age profile toward older recipients, a plausible future scenario given rising life expectancy and absent changes in bequest behavior.[53] In each scenario, we shift both the probability of receiving and the associated amounts, compute the age-specific labor supply responses implied by the model, and aggregate them up to obtain percentage changes in total earnings. Figure 14 reports the results and decomposes them into four components: (i) the *pure labor supply* effect, obtained by shifting the timing of wealth shocks while neutralizing heterogeneous amounts and cohort-size differences; (ii) the *amounts* effect, which reintroduces heterogeneity in amounts while holding cohort sizes fixed and removing the pure labor supply effect; (iii) the *cohort size* effect, which instead reintroduces observed differences in cohort sizes while holding amounts fixed and removing the pure labor supply effect; and (iv) the *interaction term*, capturing residual effects when all three channels operate jointly.

Two patterns emerge clearly. First, transferring inheritances earlier in life reduces aggregate earnings, while delaying them increases earnings. This is consistent with the model's prediction that the wealth effect on labor supply is stronger when shocks arrive earlier, especially before retirement, because individuals have more periods over which to spread additional resources and can afford to reduce hours worked.

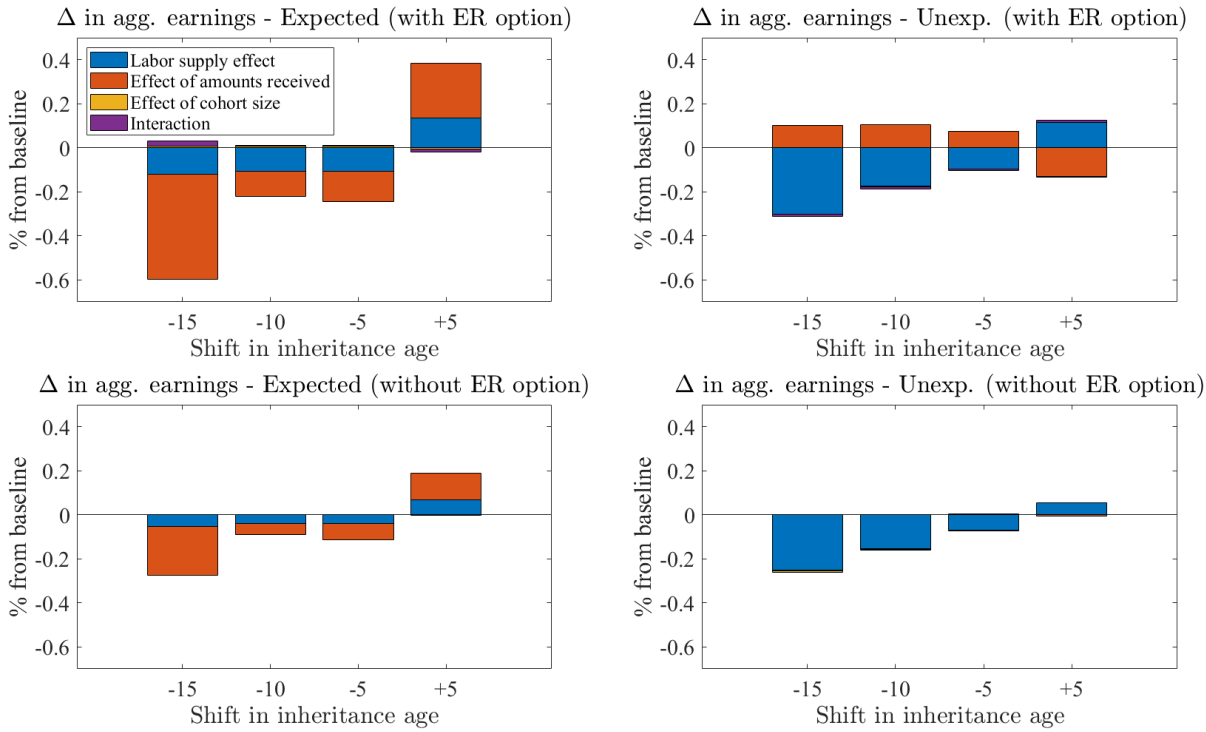
Second, the decomposition shows that the dominant channel depends on expectations. When shocks are *expected* (left panels), the pure labor supply effect is nearly constant across shifts of 5, 10, or 15 years, while most of the variation in total effects comes from differences in amounts received. Allowing for an early retirement option (top left) roughly doubles the total impact relative to the no–early-retirement case (bottom left), reflecting the model's mechanism through which additional wealth affects the extensive margin of early retirement.

When shocks are *unexpected* (right panels), the pure labor supply effect becomes more prominent. Without anticipation, the timing of the shocks directly alters current labor supply through an unmitigated wealth effect, blurring the distinction between timing and amount effects. In this case, cumulative responses are smaller overall, for the same reason unexpected shocks produce smaller effects on lifetime earnings (larger elasticity but for a smaller number of periods).

In sum, shifting the age profile toward younger recipients lowers aggregate earnings, while shifting it toward older recipients raises them, *ceteris paribus*. Compared to taxing inheritances, these shifts generate smaller aggregate effects, but the results highlight how the interaction of timing, expectations, and early retirement decisions shapes the aggregate labor-supply response.

[53] Such changes could be induced by policy incentives and/or evolving preferences for inter-vivos transfers.

Figure 14: Effects of a shift in the age structure of inherited amounts and probabilities



Notes: Amounts received (nominal), population weights and probabilities of receiving at different ages are taken from Table 2 but shifted forward or backward. The 'pure' labor supply effect is obtained by shifting the age structure of wealth shocks, but neutralizing the effects of heterogeneous amounts – giving all cohorts the same amount, obtained by averaging amounts across cohorts and the effects of cohort size – by considering identical population weights for age cohorts. The effect of amounts received considers heterogeneous amounts (as in the data) on top of shifting age and removes the 'pure' labor supply effect. The effect of cohort size considers the observed weights of each age cohort on top of shifting age, and removes the 'pure' labor supply effect. The interaction term is obtained by taking the difference between the total effect (combining all the sources of changes induced by shifting age) and the sum of the three effects (labor supply, amounts and cohort size).

6 Conclusion

We investigate empirically and theoretically how inheritance affects labor supply, both in the aggregate and by subgroups. Our analysis confirms the dominance of income effects: on the whole, inheritance – like other unearned wealth shocks – reduces labor supply. This effect is particularly pronounced for older workers, who often respond to inheritance receipt by choosing to retire early. As those 'sensitive ages' coincide with the arrival of the bulk of inheritance, responses triggered by inheritance are quantitatively non-negligible also at the macro level. Within the framework of our model and data, inheritance reduces aggregate labor supply between 1.9% (when shocks are treated as unexpected) and 2.6% (when shocks are treated as expected). This translates into a GDP loss between 1.2% and 1.7% – what one might refer to as the "output cost of inheritance".

While we believe that our analysis charts important new ground, much progress is still possible.

From a theory standpoint, our life-cycle model is highly stylized and partial-equilibrium. While it offers the benefit of closed-form expressions in the baseline case and a deep understanding of individual decisions, a richer general equilibrium model with productive capital where an inheritance tax could affect the interest rate and GDP through capital accumulation could help gain further insights. Similarly, allowing for heterogeneity in productivity levels

across individuals would shed light on the distribution of output costs of inheritance, and on the incidence and redistributive effects of a potential tax on inheritance.

Regarding the estimation of labor-supply responses, it would be particularly interesting to draw on data that allow researchers to decompose the earnings response into its different components (hours, wage rate, choice of occupation). Further, our data do not allow us to identify entrepreneurial investments in terms of time and wealth. Such responses to inheritance surely exist and could matter for overall output and productivity, but their aggregate-level weight remains to be rigorously quantified.

Perhaps the most evident omission from our quantitative analysis is inter-vivos gifts. Gifts represent a large and possibly growing share of intergenerational wealth transfers. However, the analysis of their effects on the behavior of recipients is considerably more challenging than in the case of transfers at death. The timing, the amount and even the nature of gifts are entirely endogenous. When we simulate changes in the age distribution of inheritance in this paper, we implicitly treat inter-vivos gifts as differing from inheritance only by arriving earlier, for reasons that are exogenous to the recipient. Reality is more complicated. This offers a particularly promising avenue for further research.

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A Additional tables and figures

B1 Summary statistics

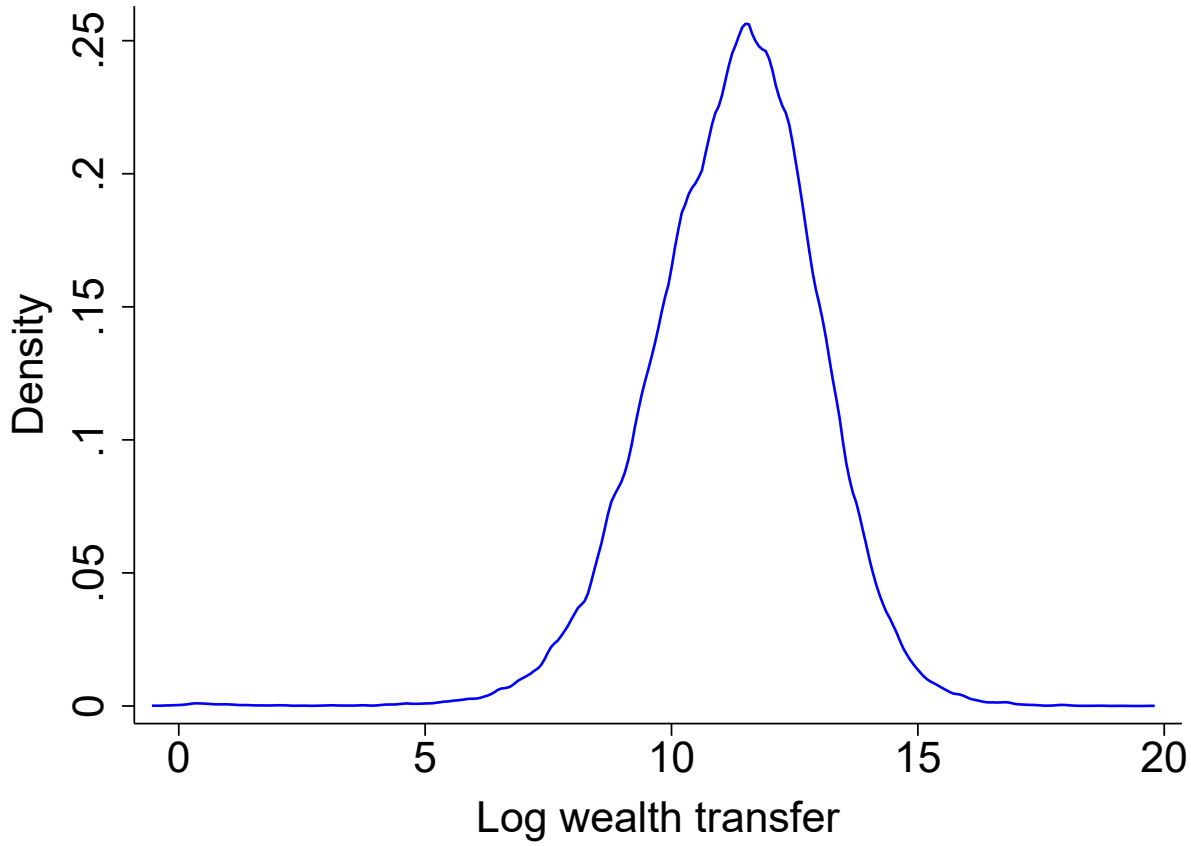
Table B1: Summary statistics

	Mean (1)	Standard deviation (2)
	Sample of heirs	
Wealth shock (CHF, p.v. adjusted)	349,703	2,335,501
Wealth shock (CHF, nominal)	129,038	699,576
Age	57.615	11.481
Female	0.532	0.499
Married	0.696	0.449
Single	0.304	0.449
Has kids < 18	0.272	0.419
Average earnings (CHF)	43,500	43,121
Taxable income (CHF)	38,596	70,201
Net wealth (CHF)	303,852	2,662,145
N of recipients	135,150	
	Sample of lottery winners	
Wealth shock (CHF, p.v. adjusted)	352,662	3,256,443
Wealth shock (CHF, nominal)	123,261	1,128,965
Age	50.846	12.139
Female	0.459	0.498
Married	0.570	0.483
Single	0.430	0.483
Has kids < 18	0.303	0.436
Average earnings (CHF)	44,029	35,959
Taxable income (CHF)	33,556	42,179
Net wealth (CHF)	93,886	297,036
N of recipients	5,340	

Notes: This table reports summary statistics for the main variables used in the analysis, separately for individuals who receive a positive wealth shock (inheritance or lottery win). The unit of observation is an individual. The table shows the number of observations, means, and standard deviations. Earnings and wealth variables are expressed in Swiss francs. The sample is restricted to individuals with a recorded wealth shock of at least CHF 10,000. See Section 2.1 for sample construction and variable definitions.

B2 Wealth shock distribution

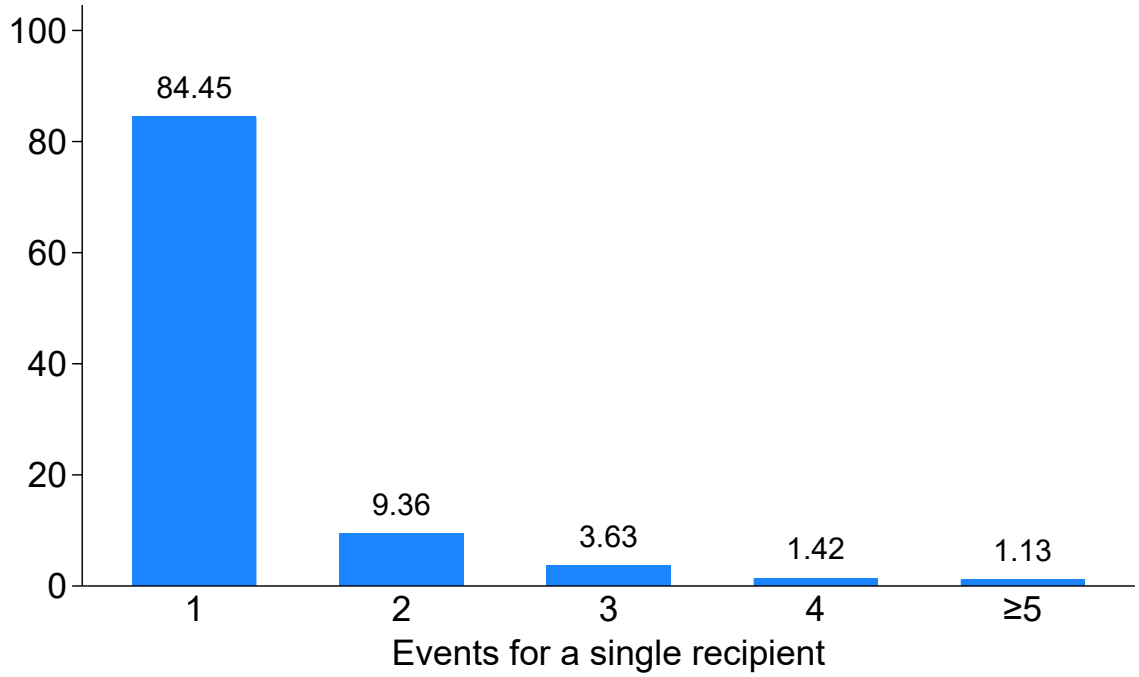
Figure B1: Wealth shock distribution



Notes: This figure shows the distribution of the size of wealth shocks in log CHF. The y-axis represents the estimated probability density function obtained via kernel smoothing.

B3 Frequency of wealth transfers

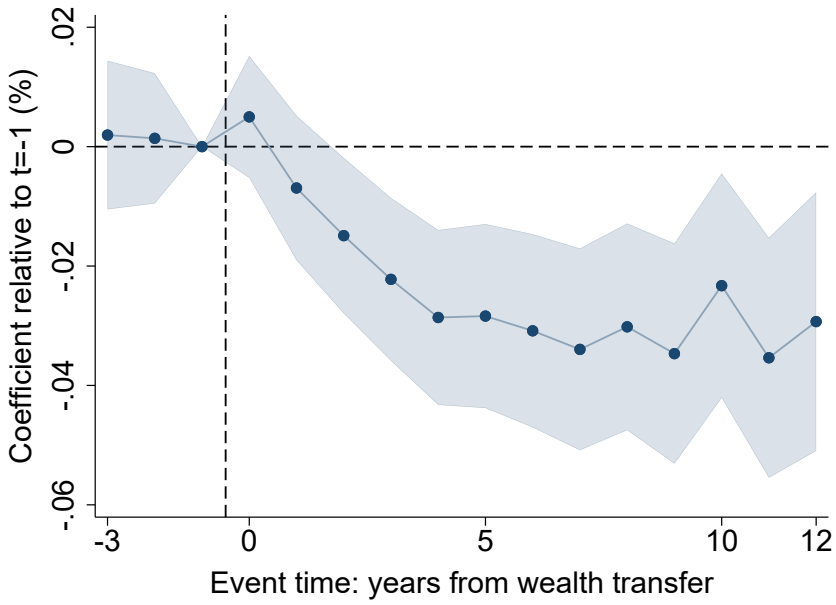
Figure B2: Frequency of wealth transfers



Notes: This figure displays the distribution of the number of wealth transfers per individual across the full sample. It includes all types of observed wealth shocks (as declared on tax returns): inheritances, lottery wins, and inter-vivos gifts. The figure highlights that the vast majority of individuals experience only a single wealth shock over the observation period, underscoring the infrequency and lumpy nature of such events. This supports our empirical strategy focusing on discrete treatment events and helps interpret extensive-margin responses as capturing behavior following largely isolated transfers.

B4 Long-run impact

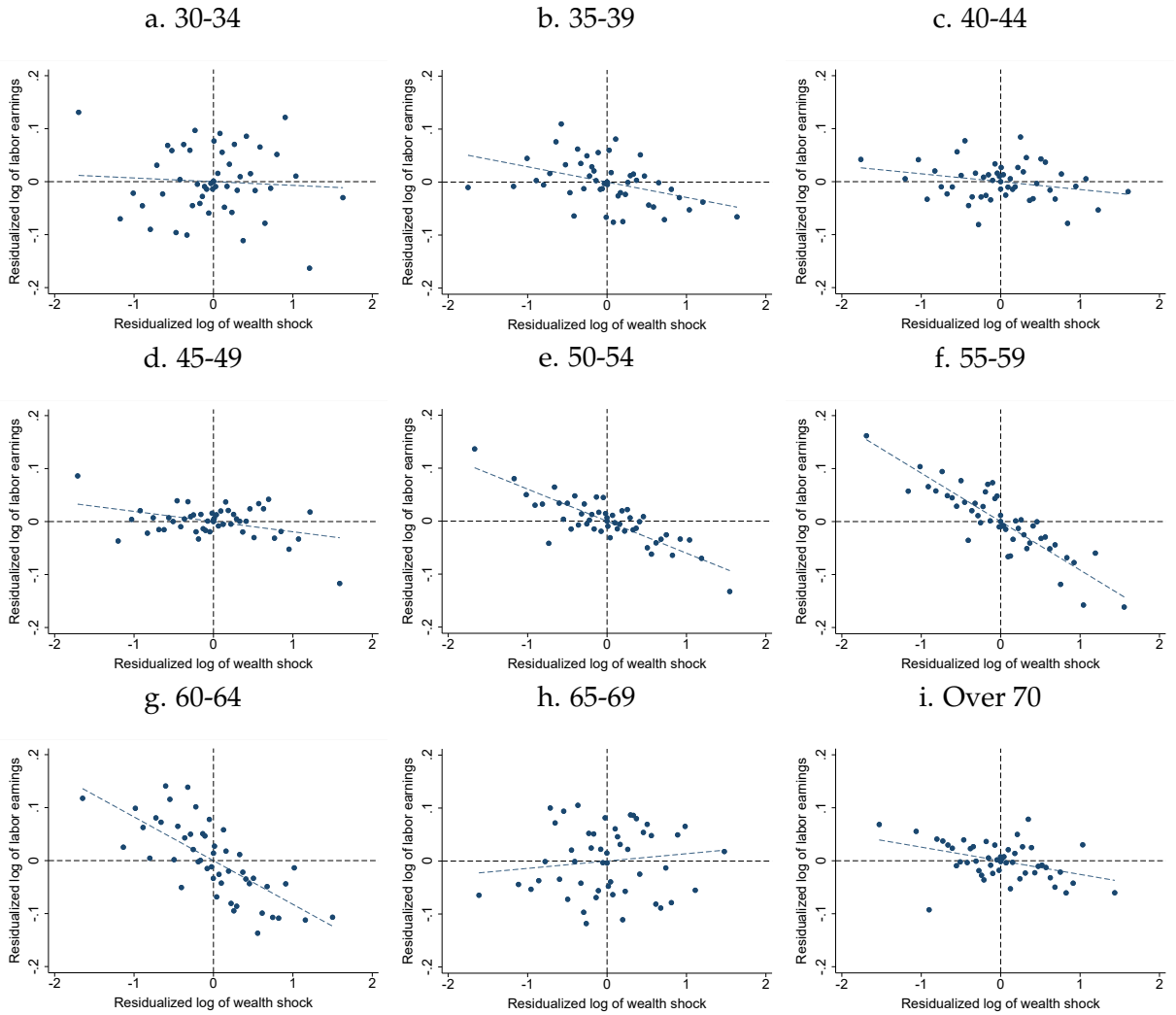
Figure B3: Event-study estimate of the long-run earnings response



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 12]$ years from the realization of the shock. Standard errors are clustered by individuals. The wealth shock includes both inheritances and lottery wins.

B5 Binscatter by age group

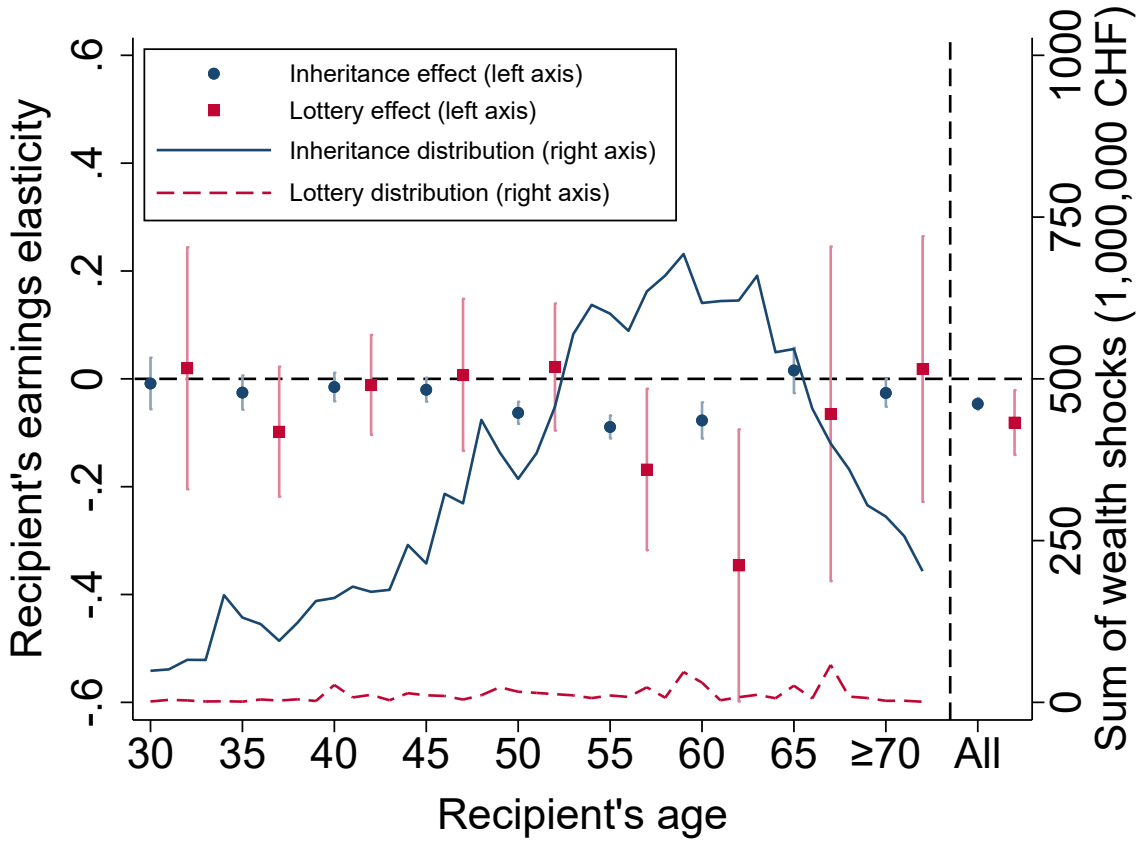
Figure B4: Binscatter by age group



Notes: For each recipient's age group, the corresponding figure provides a graphical representation of the labor earnings elasticity with respect to wealth shocks, including both inheritances and lottery wins. It compares the log of labor earnings (vertical axis) with the interaction of the log of the present-value adjusted wealth shock and the post-treatment dummy (horizontal axis). We depict the residuals obtained by regressing each variable on individual fixed effects and age at the time of the shock-calendar year fixed effects. Each figure plots the residuals in 50 equal-sized bins and shows the line of best fit, which corresponds to the β estimate obtained from regressing equation (1), estimated over a time interval spanning -3 to 5 years from the wealth shock. For sample sizes, see Table 2.

B6 Life-cycle responses to inheritance and lottery wins

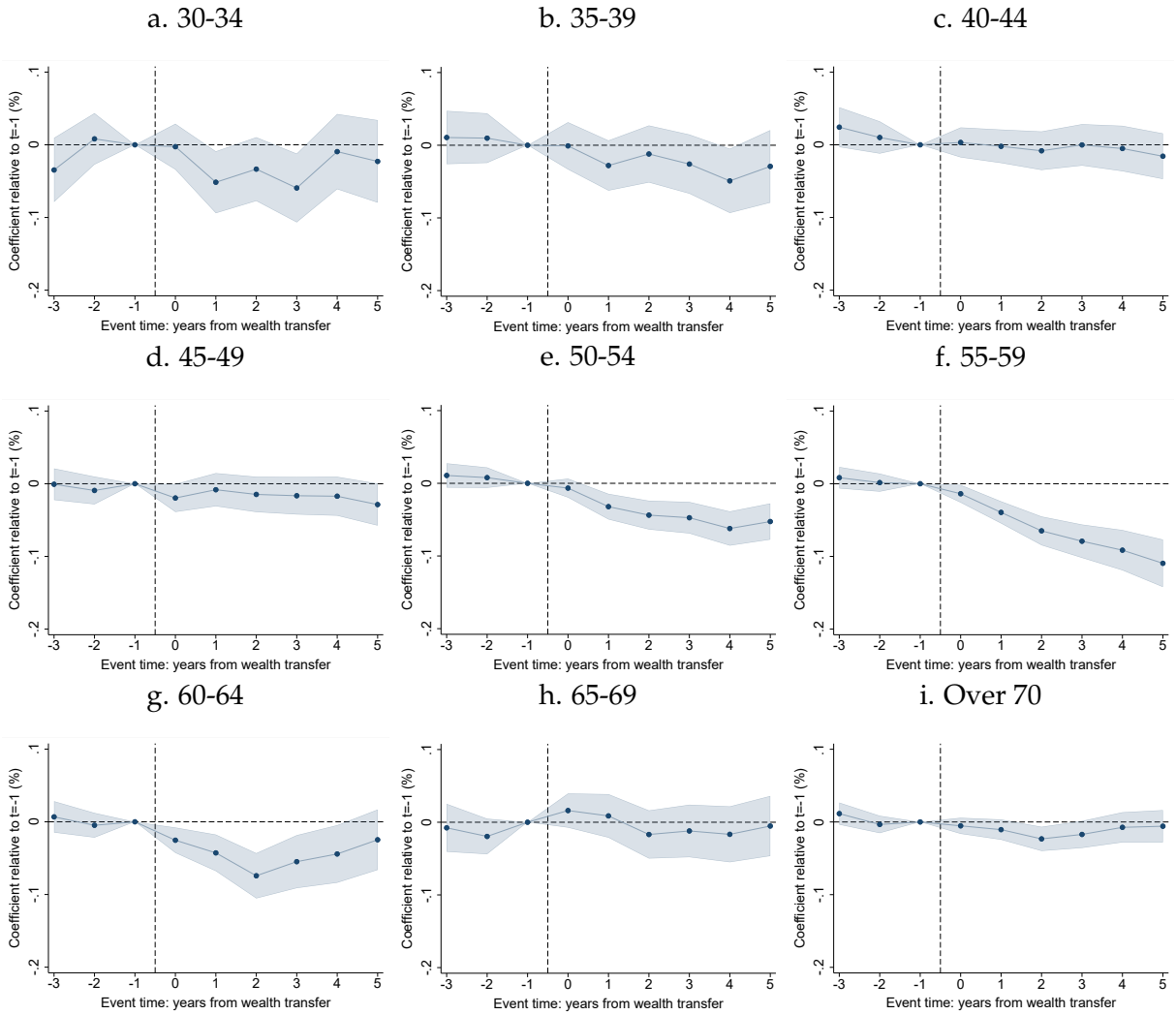
Figure B5: Age profile responses by wealth



Notes: This figure shows age-specific earnings elasticities to inheritances (blue circles) and lottery wins (red squares), obtained by estimating the DiD equation (1). Each point reflects the estimated elasticity of log labor earnings with respect to log present-value adjusted wealth shocks, computed separately by age group at the time of receipt (left axis). The elasticity for "All" corresponds to the pooled estimate across all ages. Each elasticity is estimated over a time interval spanning -3 to 5 years around the realization of the wealth shock. The figure also shows the empirical distribution of each type of wealth transfer (blue line for inheritance and red line for lottery wins; right axis), measured as the sum of wealth shocks received by each age group (in CHF million, pooled over 2002-2019). The sample contains 1,266,430 person-year observations.

B7 Event-study results for inheritances by age group

Figure B6: Event-study results for inheritances by age group

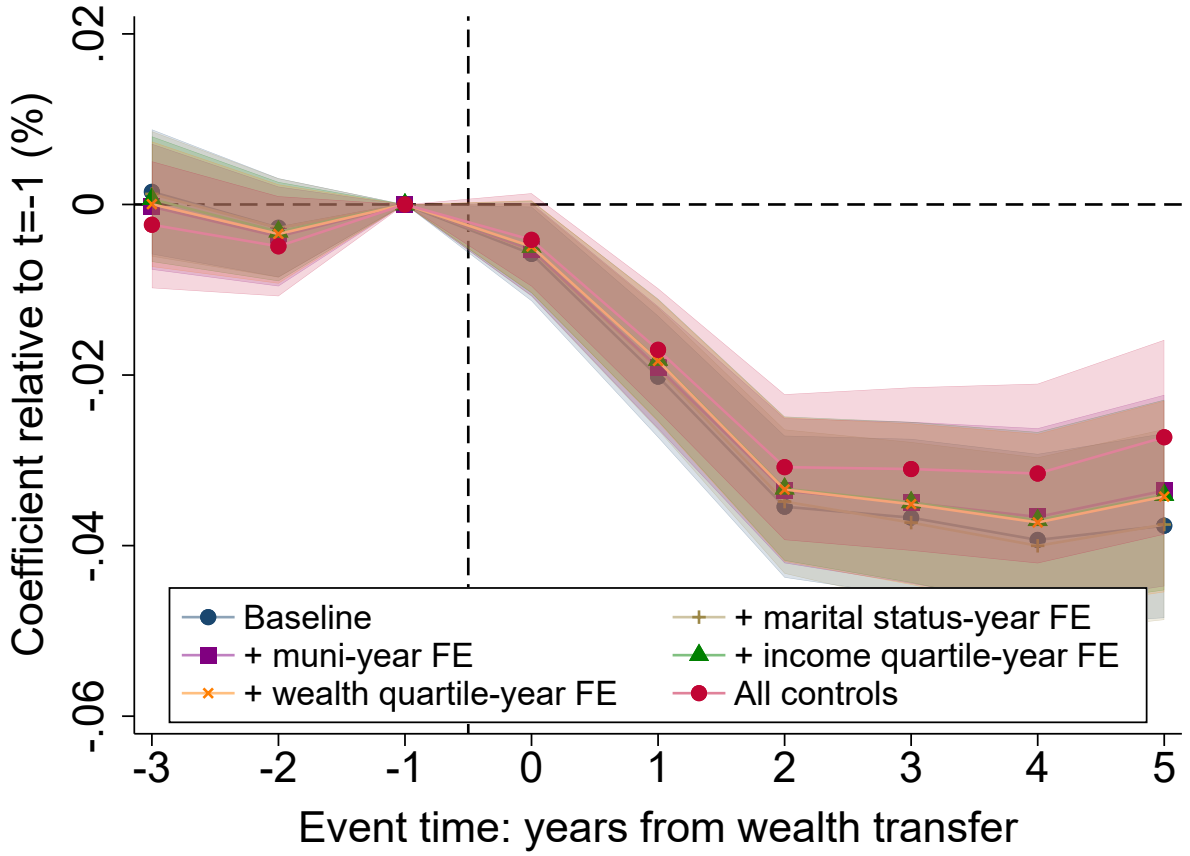


Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings by age group. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. For sample sizes, see Table 2.

B Robustness

C1 Event-study results with additional controls

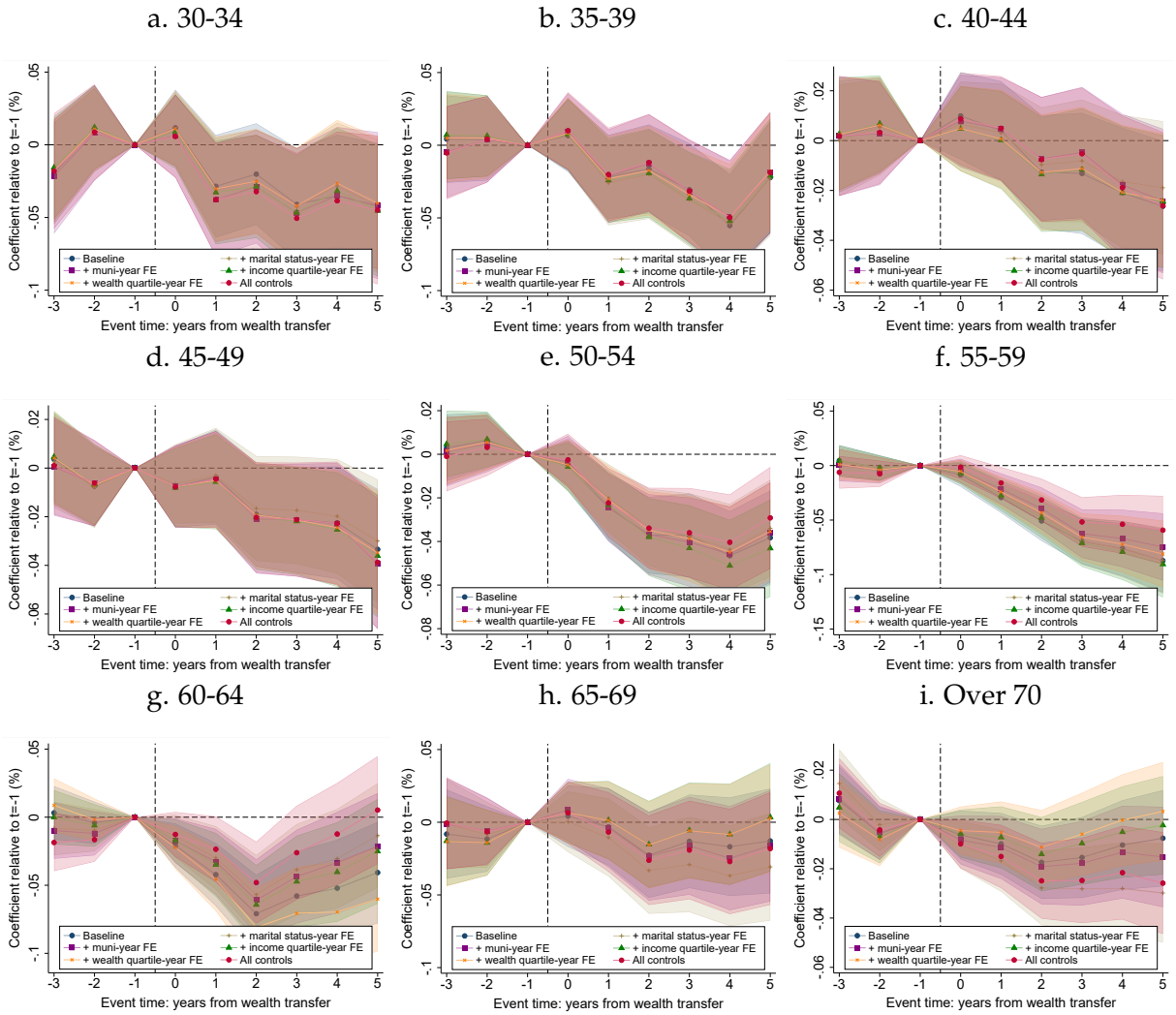
Figure C1: Event-study results with additional controls



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. The figure shows estimates of six specifications: (i) baseline controls (individual fixed effects and age-by-year fixed effects); (ii) baseline plus marital status-by-year fixed effects; (iii) plus municipality-by-year fixed effects; (iv) plus pre-shock income quartile-by-year fixed effects; (v) plus pre-shock wealth quartile-by-year fixed effects; and (vi) a fully saturated model including all additional controls. These additional fixed effects are intended to account for potentially confounding shocks and to refine the comparison groups by conditioning on more granular characteristics.

C2 Event-study results by age with additional controls

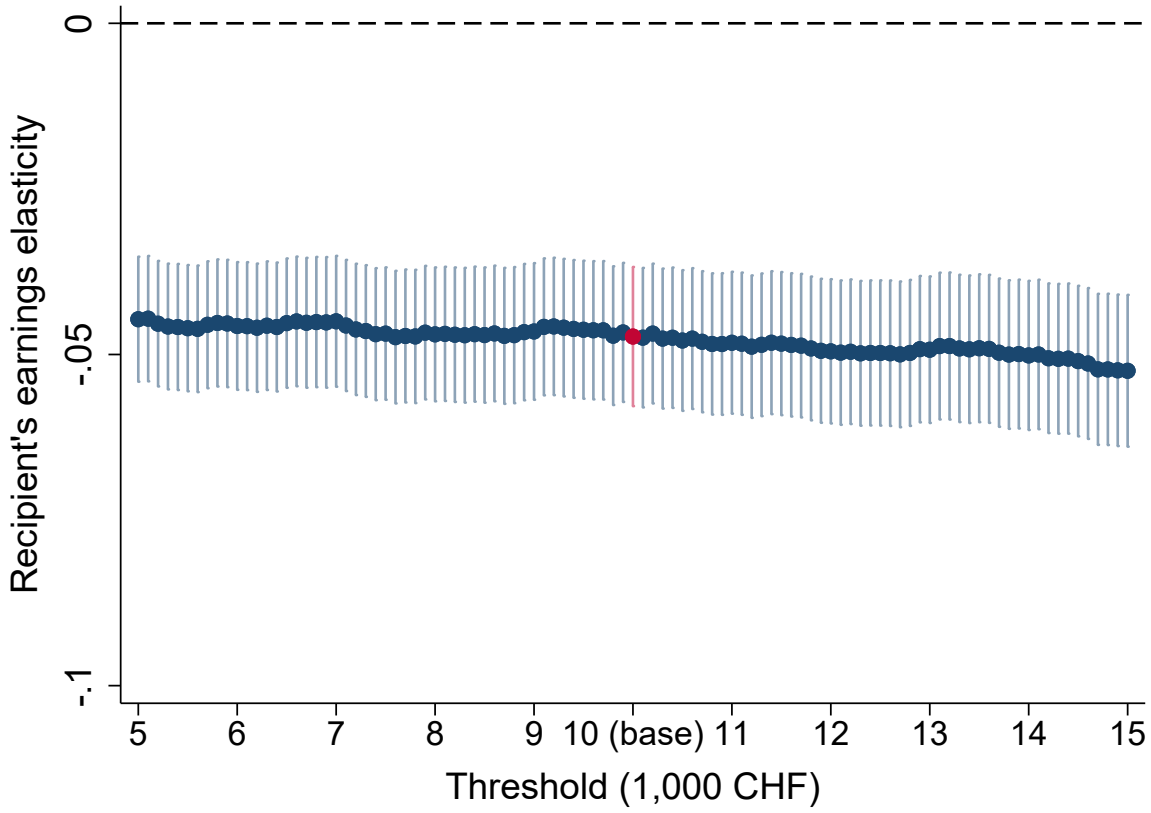
Figure C2: Event-study results by age with additional controls



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings by age group. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. The figure shows estimates of six specifications: (i) baseline controls (individual fixed effects and age-by-year fixed effects); (ii) baseline plus marital status-by-year fixed effects; (iii) plus municipality-by-year fixed effects; (iv) plus pre-shock income quartile-by-year fixed effects; (v) plus pre-shock wealth quartile-by-year fixed effects; and (vi) a fully saturated model including all additional controls. These additional fixed effects are intended to account for potentially confounding shocks and to refine the comparison groups by conditioning on more granular characteristics.

C3 Sensitivity to varying the CHF 10,000 threshold

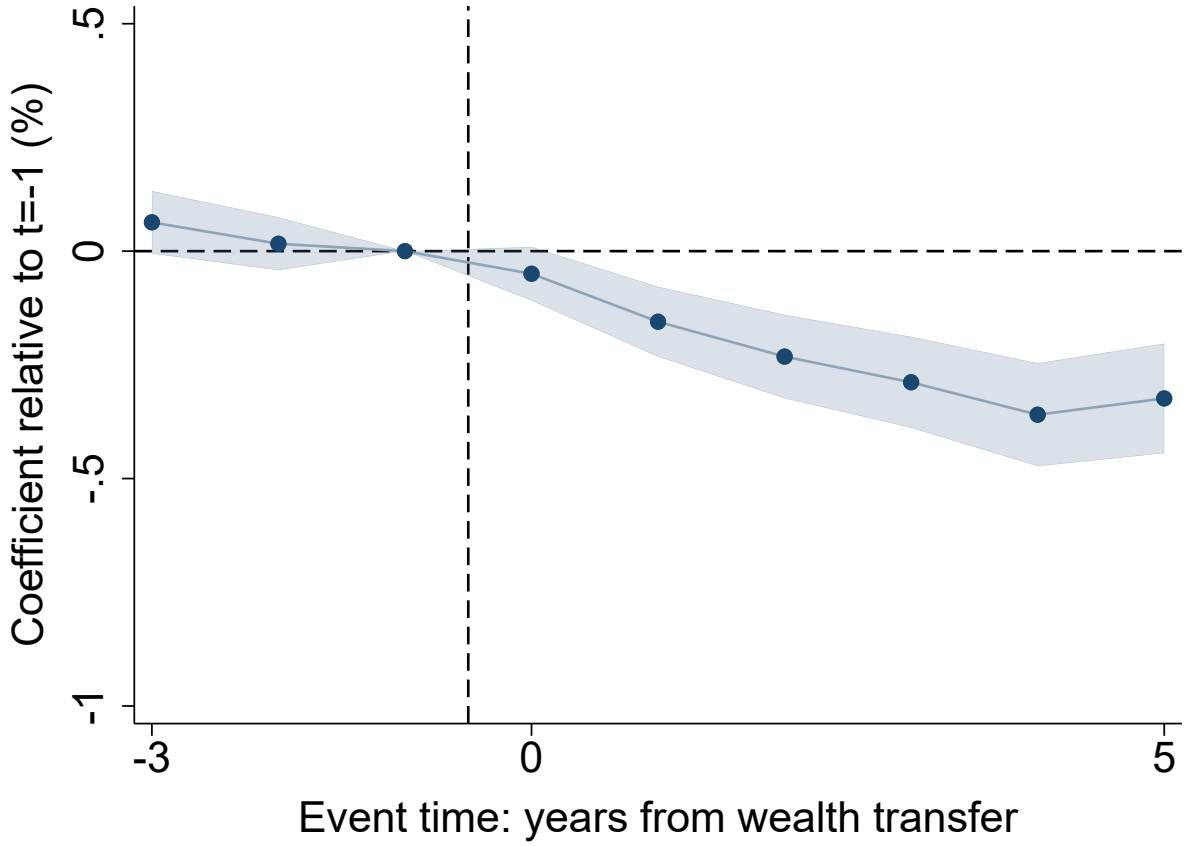
Figure C3: Sensitivity to varying the CHF 10,000 threshold



Notes: This figure tests the sensitivity of our main estimates to perturbations of the CHF 10,000 threshold used in the baseline analysis (we exclude all inheritances and lottery wins below CHF 10,000, considering them unlikely to affect earnings behavior). We re-run equation (1) by choosing thresholds from CHF 5,000 to CHF 15,000 and using increments of CHF 100. The figure shows that alternative threshold choices (in blue) yield estimates that remain remarkably similar to the baseline (in red).

C4 Event-study results with a discrete treatment

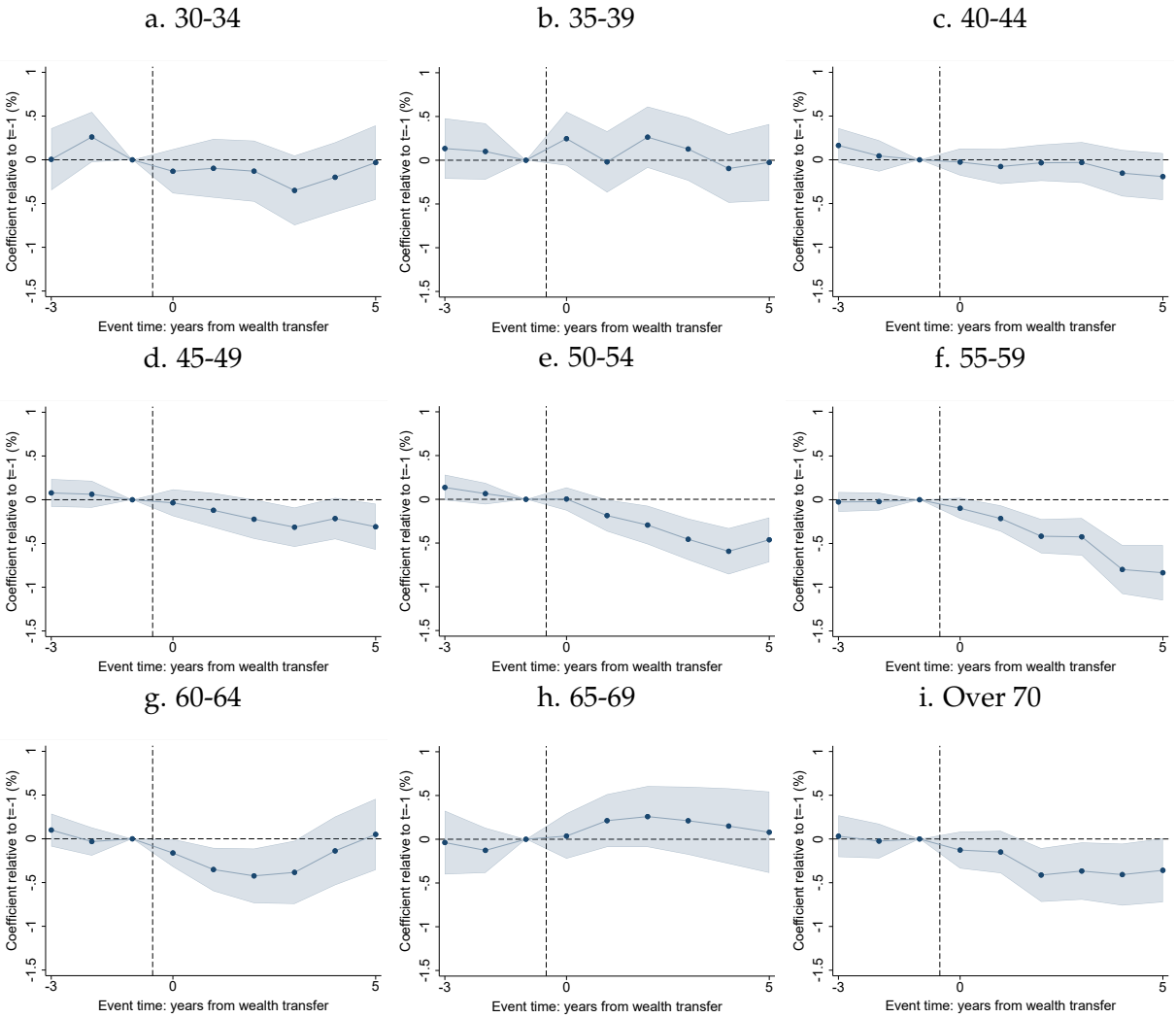
Figure C4: Event-study results with a discrete treatment



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2), but using a discrete treatment rather than a continuous one: each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. We classify individuals who receive a wealth shock below the average as the control group, and those who receive a shock larger than five times the average as the treated group.

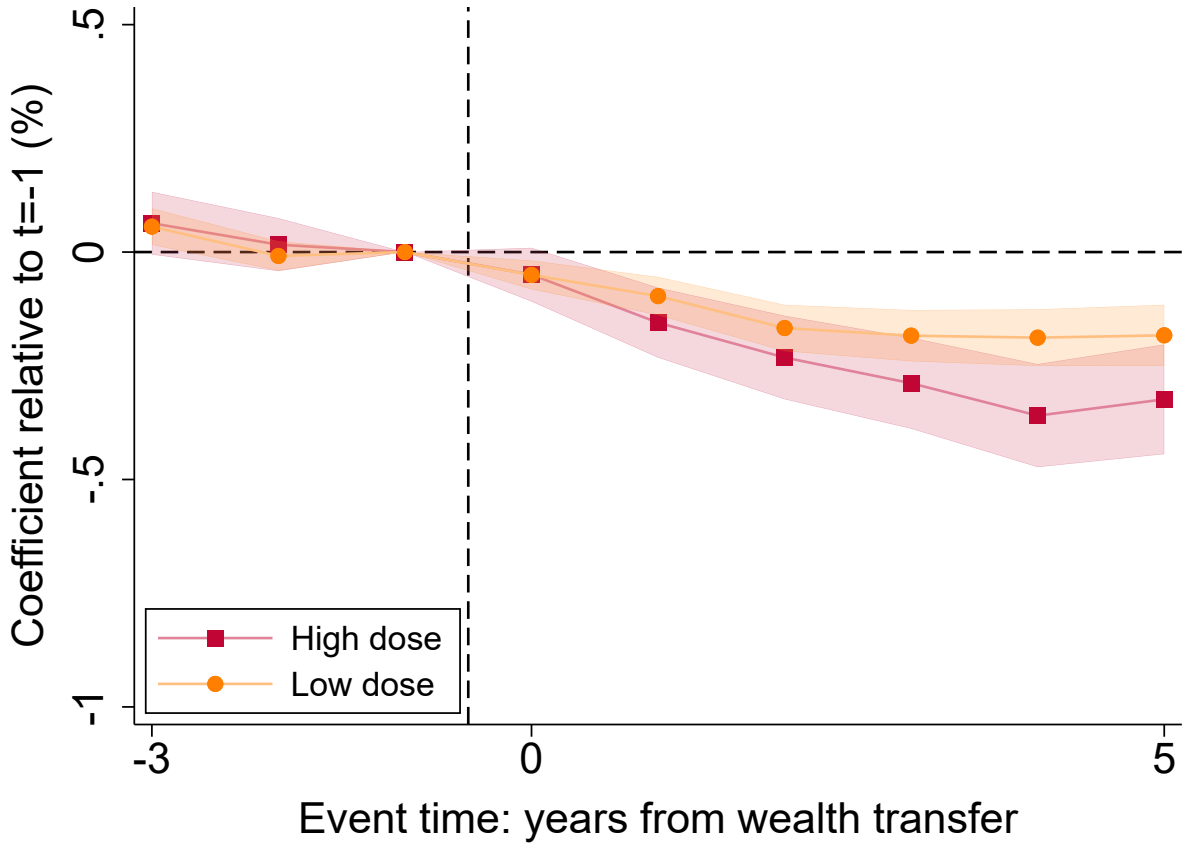
C5 Event-study results by age with a discrete treatment

Figure C5: Event-study results with a discrete treatment by age group



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings by age group. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2), but using a discrete treatment rather than a continuous one: each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. We classify individuals who receive a wealth shock below the average as the control group, and those who receive a shock larger than five times the average as the treated group.

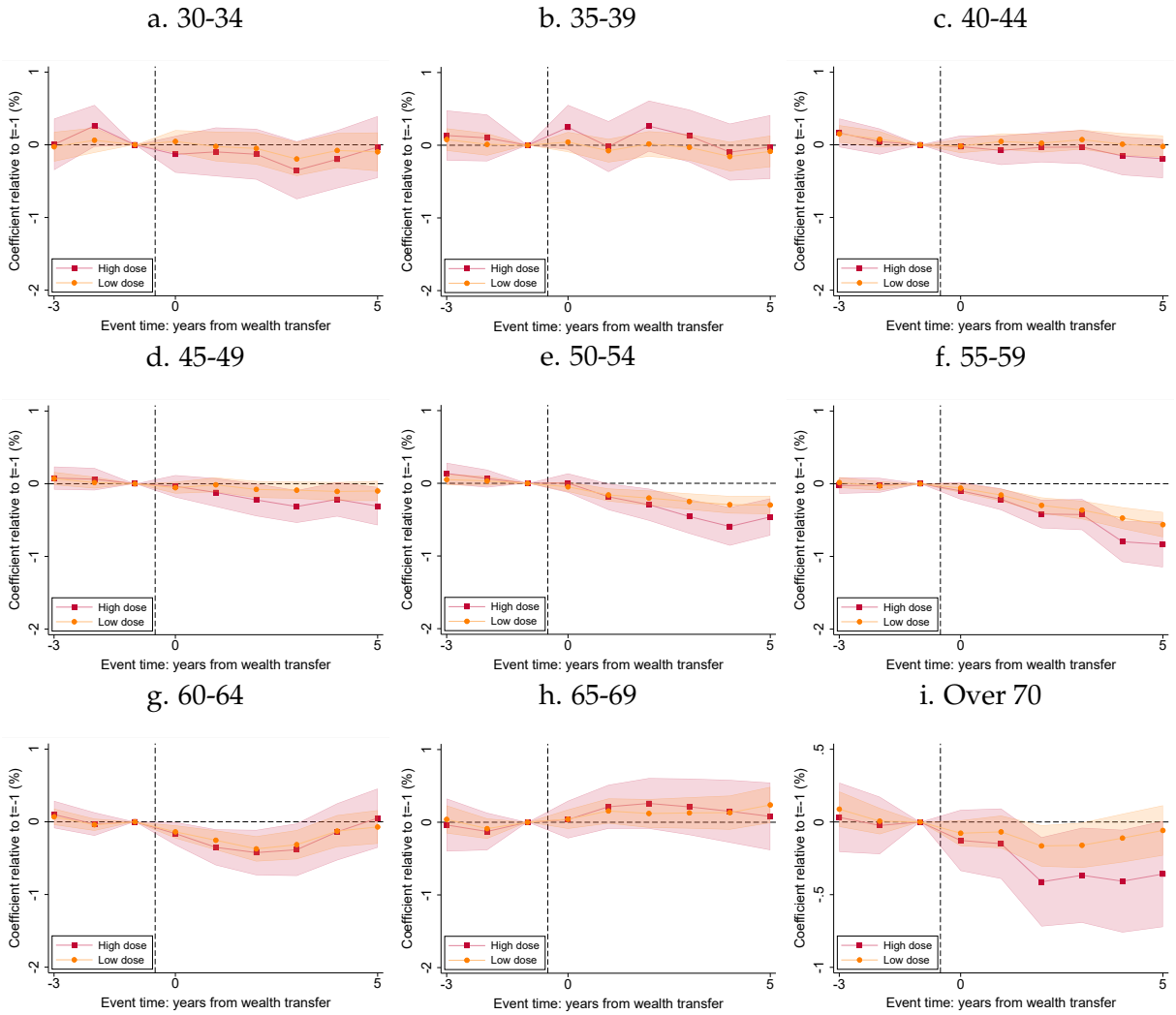
Figure C6: Event-study results with discrete treatment and different doses



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2), but using a discrete treatment rather than a continuous one: each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. We define "low-dose" treatment as wealth shocks below the average (orange circles), and "high dose" as wealth shocks larger than five times the average (red squares).

C6 Event-study results with a discrete treatment and different doses by age group

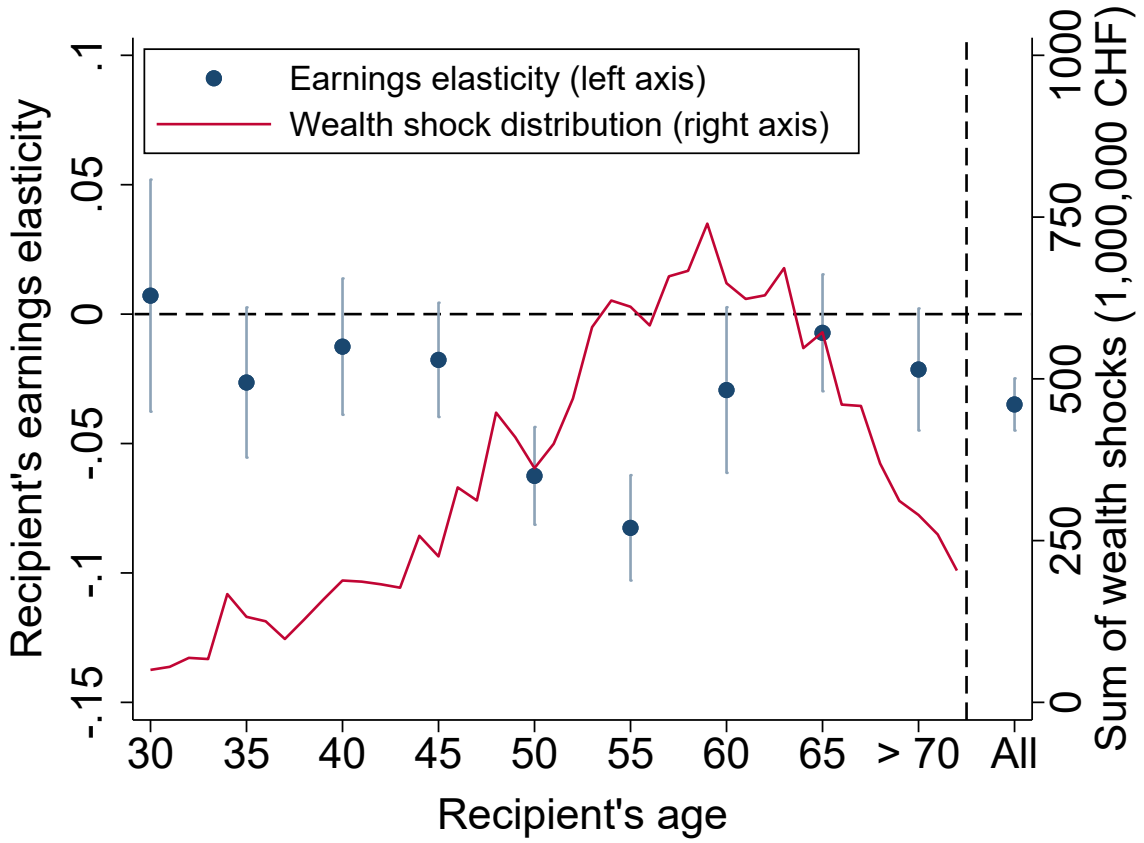
Figure C7: Event-study results with a discrete treatment and different doses by age group



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings by age group. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2), but using a discrete treatment rather than a continuous one: each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. We define "low-dose" treatment as wealth shocks below the average (orange circles), and "high dose" as wealth shocks larger than five times the average (red squares).

C7 Treatment scaled by pre-shock income

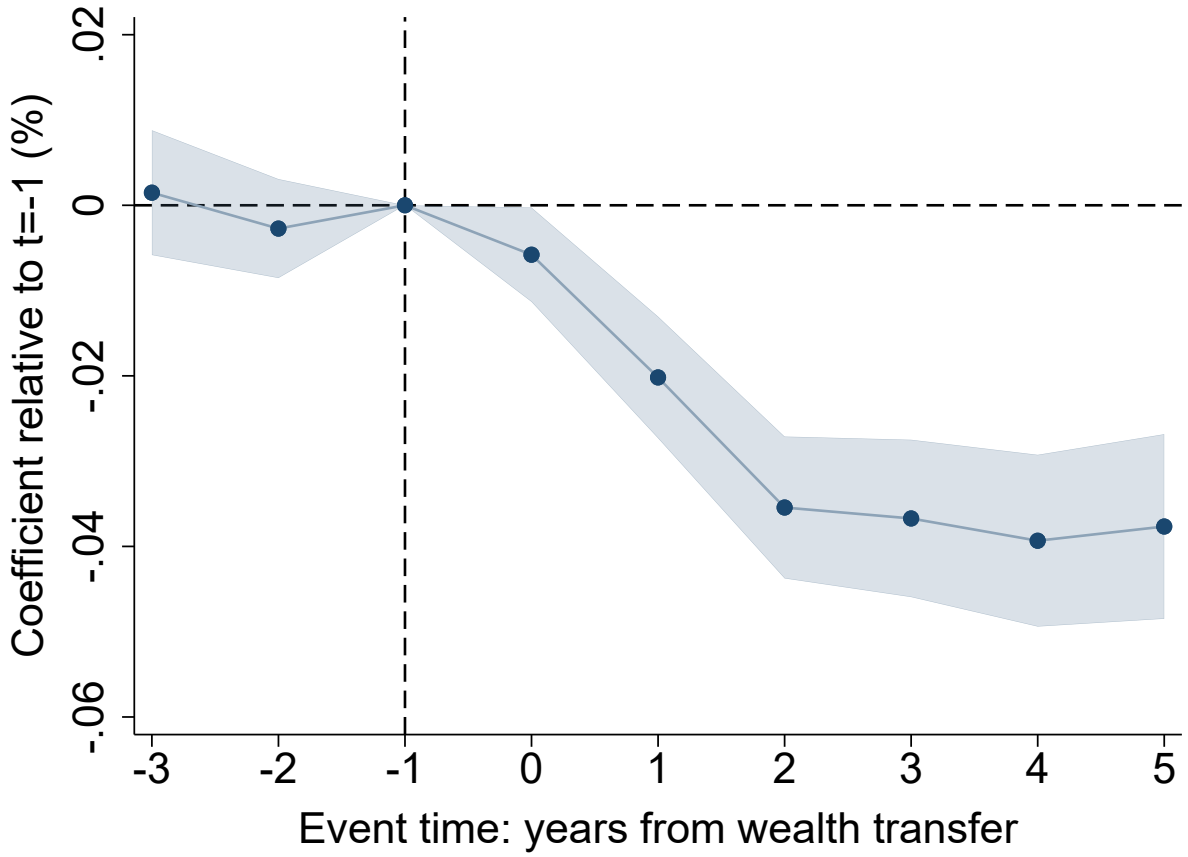
Figure C8: Treatment scaled by pre-shock income



Notes: This figure shows age-specific earnings elasticities to wealth shocks, obtained by estimating the DiD equation (1). Each point reflects the estimated elasticity of log labor earnings with respect to log present-value adjusted wealth shocks, computed separately by age group at the time of receipt (left axis). Wealth shock are scaled by individual-level pre-shock labor earnings, measured as average earnings over the three years preceding the shock. The elasticity for "All" corresponds to the pooled estimate across all ages. Each elasticity is estimated over a time interval spanning -3 to 5 years around the realization of the wealth shock. The figure also shows the empirical distribution of wealth transfers (red line; right axis), measured as the sum of wealth shocks received by each age group (in CHF million, pooled over 2002-2019). The sample contains 1,266,430 person-year observations.

C8 Event-study results using a balanced sample

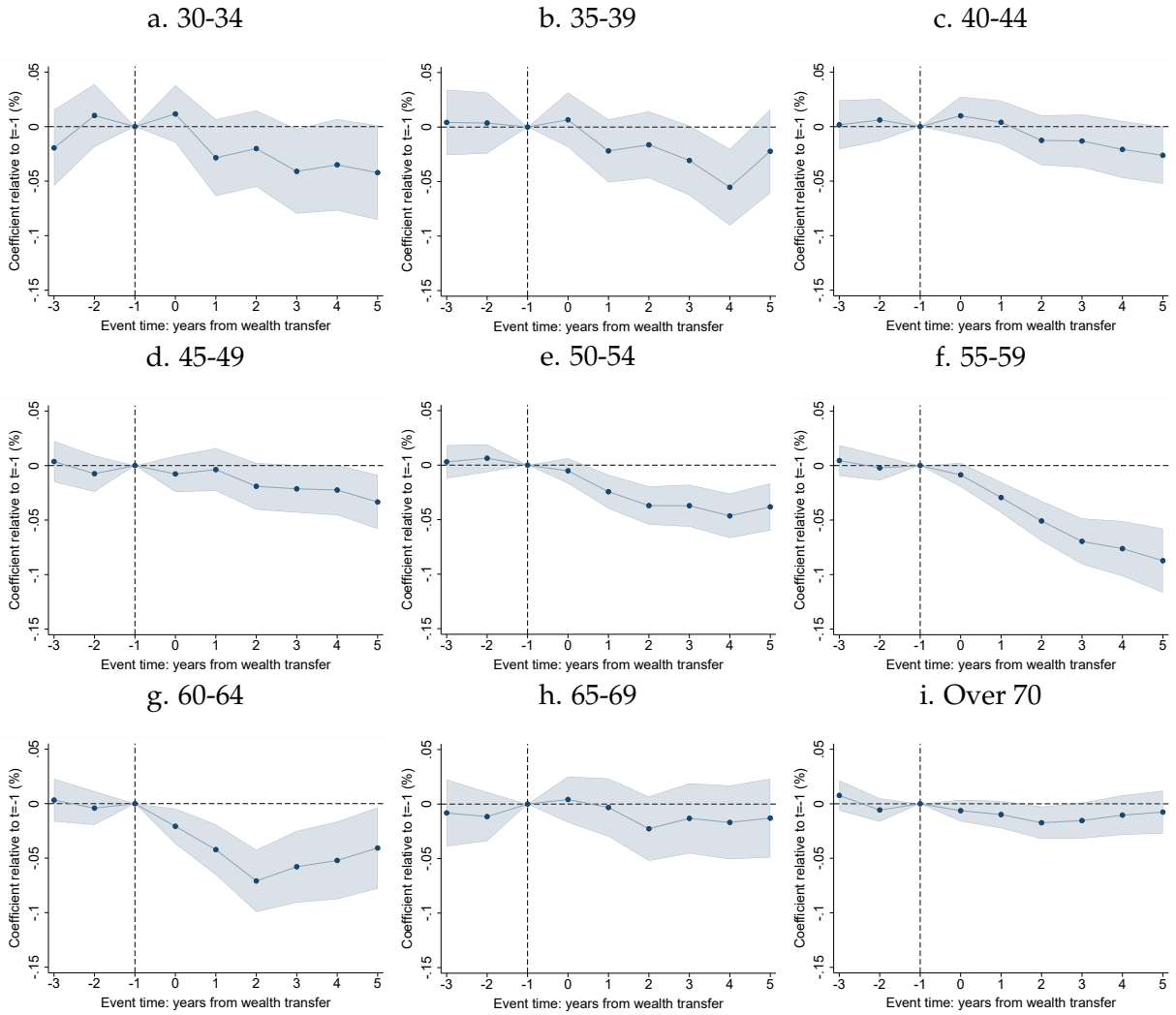
Figure C9: Event-Study Result Using a Balanced Sample



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. These estimates are based on a balanced sample of individuals whom we observe for at least three years before and five years after the wealth shock.

C9 Event-study results by age using a balanced sample

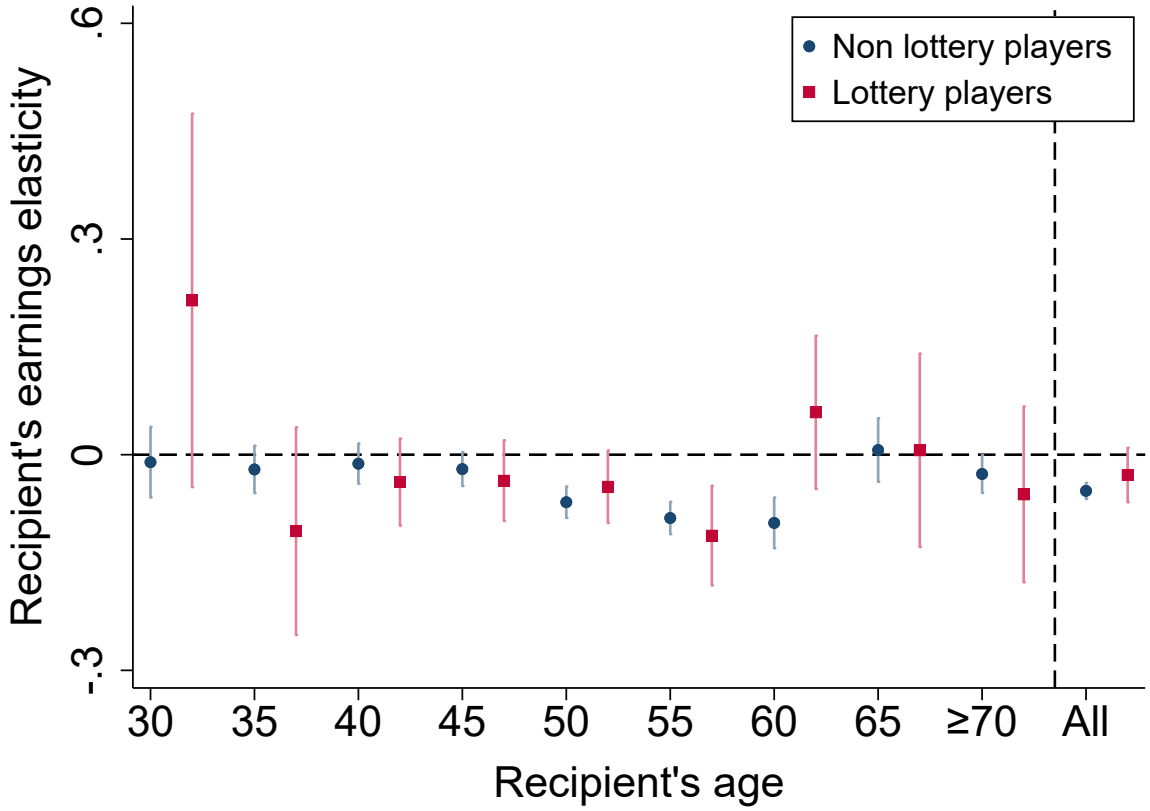
Figure C10: Event-study results by age using a balanced sample



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings by age group. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. These estimates are based on balanced samples of individuals whom we observe for at least three years before and five years after the wealth shock.

C10 Are lottery players different?

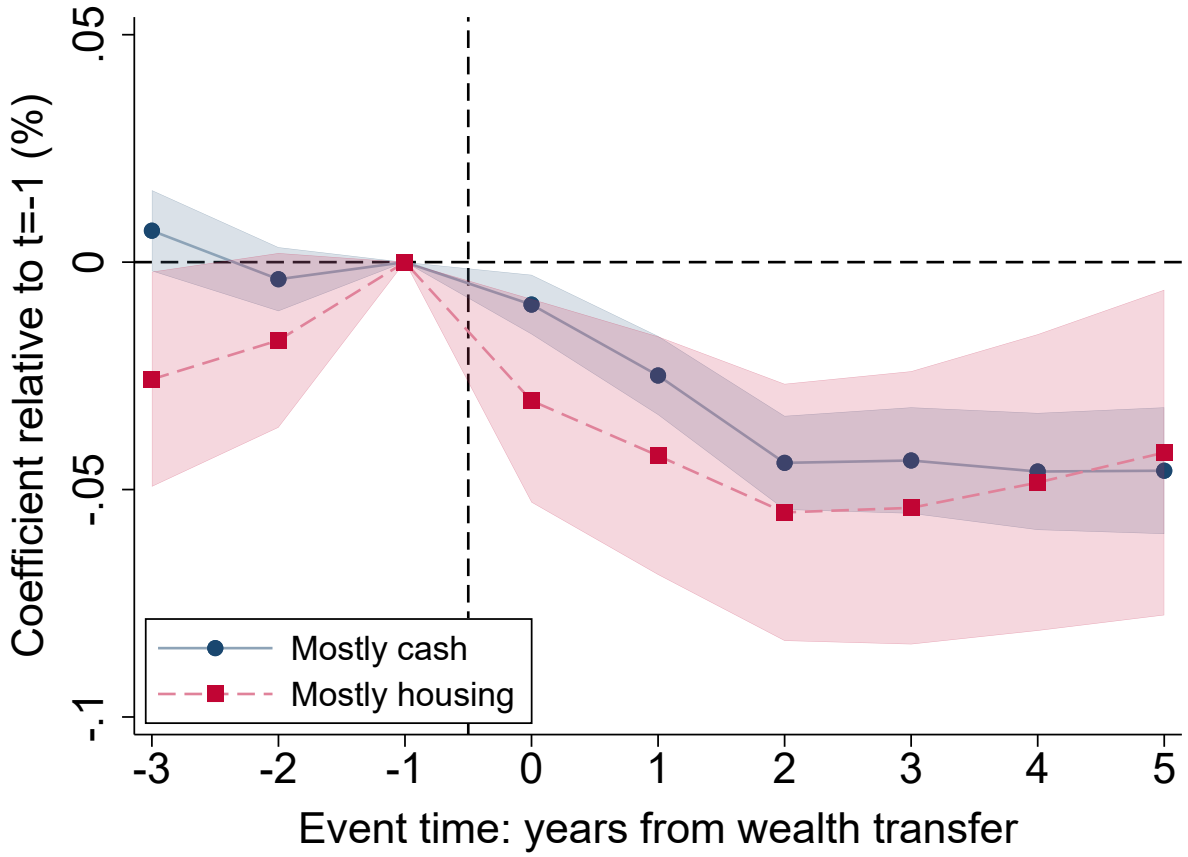
Figure C11: Are lottery players different?



Notes: This figure examines whether individuals who play the lottery exhibit different earnings responses to wealth shocks compared to the general population of inheritance recipients. The figure plots age-specific earnings elasticities to wealth shocks, as estimated from equation (1), separately for the sample of heirs who do not play the lottery (blue circles) and those who play the lottery (red squares). Each point represents the estimated elasticity of log labor earnings with respect to log present-value adjusted wealth shocks, calculated separately for each age group at the time of receipt. An additional estimate labeled "All" corresponds to the pooled elasticity across all ages. The estimation window spans from three years before to five years after the wealth shock. Lottery players are defined as individuals who have declared a lottery win (usually of trivial size) over the observation period in the data.

C11 Do liquidity and attachment effects attenuate responses?

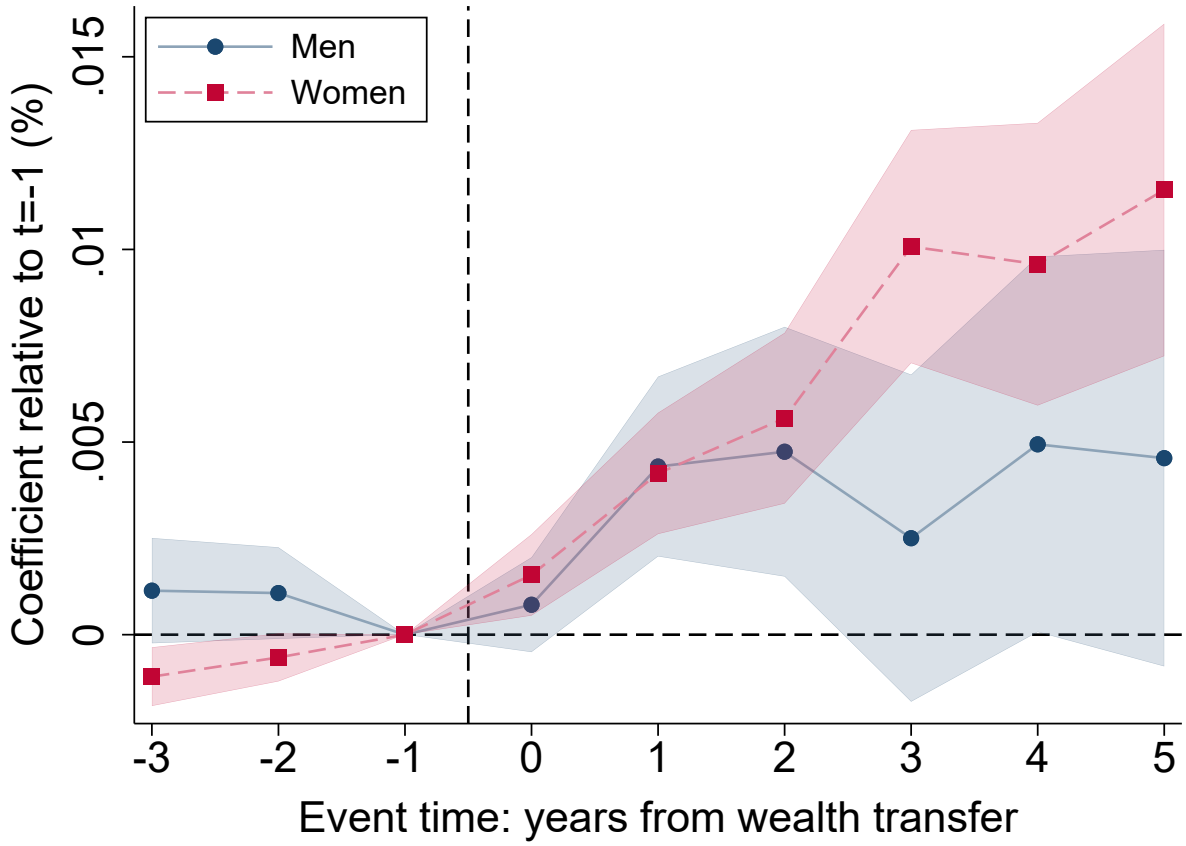
Figure C12: Do liquidity and attachment effects attenuate responses?



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. 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").

C12 Early retirement responses by gender

Figure C13: Early retirement responses by gender



Notes: This figure shows the event-study coefficient estimates of the impact of receiving a wealth shock on the log of labor earnings. It plots coefficient estimates and the 95 percent confidence intervals obtained from equation (2): each point shows the effect $k \in [-3, 5]$ years from the realization of the shock. Standard errors are clustered by individuals. Wealth shocks include both inheritances and lottery wins. The outcome variable is a binary indicator equal to one in each year before the statutory retirement age (65 for men, 64 for women) during which the individual begins receiving an occupational or public pension, or cashes out pension savings for retirement, conditional on having been labor-market active in the previous year. The earliest possible age to formally retire early is 58, hence, we consider individuals who receive a wealth shock at ages 55–59.

C Institutional background

D1 Taxation of income, wealth and wealth transfers in Switzerland

D1.1 Taxable income and wealth

Our data come from annual filings for income and wealth taxes. Those declarations have to be submitted by all households, with married couples filing jointly.

Wealth and income are self-reported. To encourage taxpayers to report capital incomes and corresponding wealth, a withholding tax of 35% is levied on dividends and interest, including interest income from Swiss bank accounts (above an exemption of CHF 200). Since the withholding tax rate typically exceeds the marginal consolidated income tax rate, taxpayers have an incentive to report the corresponding assets, in which case the withholding tax is refunded. With the introduction of the automatic exchange of information in 2017, foreign bank accounts of Swiss taxpayers in over 100 countries are automatically reported to the Swiss tax authorities, providing an incentive for taxpayers to declare those accounts as well (Baselgia (2023)).

The canton of Bern further mandates that employers send the salary information of their employers directly to the cantonal tax authorities, such that wage income is third-party reported (at least for those taxpayers whose employer is located in the canton, as employers in other cantons may not always be aware of this cantonal rule).

The cantonal tax administration implements automated checks on how income and wealth evolve over time. Changes in reported wealth that are not consistent with the evolution of income are inspected further by the authorities and require an explanation. For this reason, it is common for taxpayers to also report gifts, inheritances and lottery winnings – even in cases where they are not subject to taxation.

D1.2 Lottery taxes

Subject to the lottery tax are winnings in cash and in kind from traditional lotteries (Lotto), raffle tickets, sweepstakes, sport gambles, or race betting.[54] At the federal level, lottery gains are taxed as income, together with all other income sources.[55] The progressive federal income tax defaults to a flat maximum average tax rate of 11.5% for taxable incomes above a specified threshold.[56]

For the canton and municipal tax, respectively, the canton of Bern applies a flat rate tax of 10%, after a deduction of 5% of the amount won.[57] Figure D1 shows the marginal and average tax rates on lotteries in the canton of Bern over the period 2002-2018. Individuals subject to the church tax face an additional 8% tax on their winnings.[58] The canton of Bern, however, caps the total tax burden on lottery winnings at 35%, to maintain the reporting incentives in light of the 35% withholding tax (this provision is only relevant for individuals subject to church tax).

[54] Since 2019, winnings from casino games and poker tournaments are also subject to lottery taxes in some cases. At the same time, the tax exemption level for most (but not all) lotteries was increased to 1m CHF. We therefore limit our analysis to lottery winnings prior to 2019.

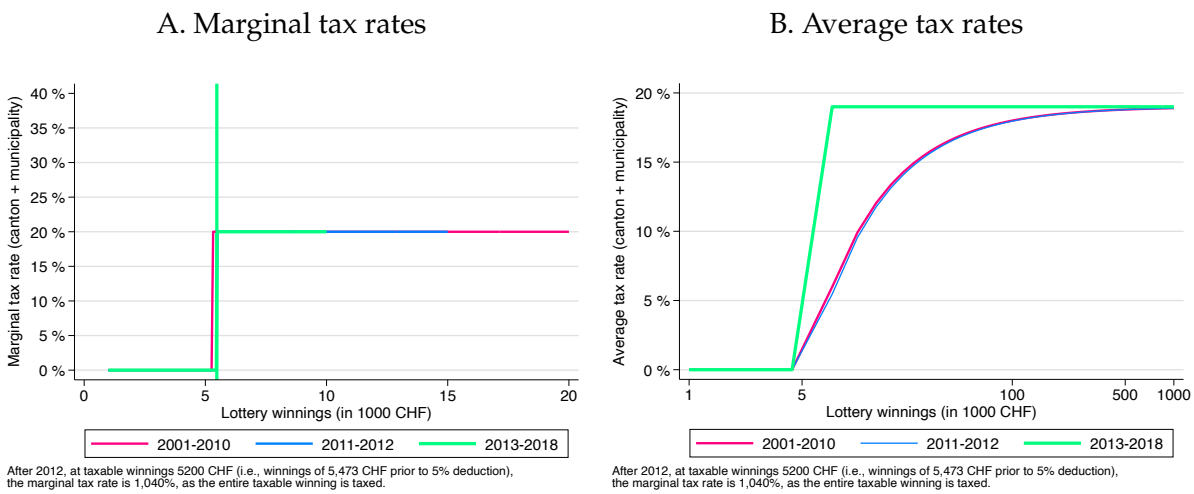
[55] Up until 2013, verifiable costs up to the total amount won could be deducted. Since 2014, 5% of the amount won can be deducted, with a cap of CHF 5,000. Since 2014, winnings below CHF 1,000 are exempt.

[56] In 2002, the threshold was CHF 664,400 for singles and CHF 788,500 for married taxpayers, respectively. Tax brackets are adjusted regularly for inflation.

[57] Amounts smaller than CHF 5,000 (after the 5% deduction) are not taxed. In 2011, this exemption was raised to CHF 5,200, but since 2013, winnings exceeding the exemption amount are fully taxed.

[58] In Switzerland, cantonal church taxes are levied by officially recognized churches. Individuals who declare to be members of such a church are liable for church tax on their income and wealth.

Figure D1: Lottery tax rates, canton of Bern



Notes: The figures plot statutory lottery tax rates in the canton of Bern. For the federal tax, lotteries are treated as income and hence added to the income tax base, which is why the federal tax on lotteries is not included in the graph. At the top, the federal income tax defaults to a flat rate average tax of 11.5%.

D1.3 Inheritance and gift taxes

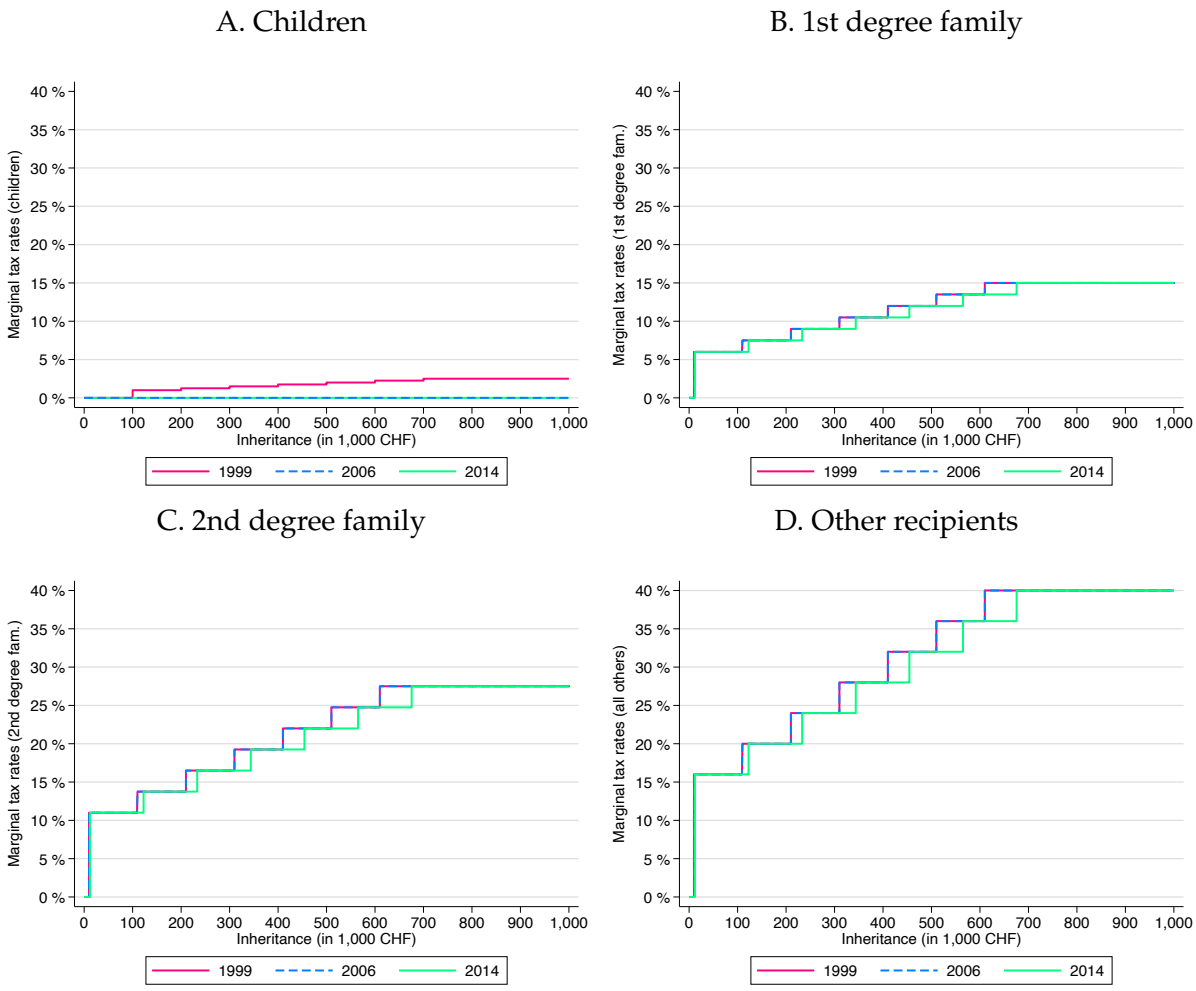
Bequests are only taxed at the sub-federal level, by cantons and municipalities. Inheritances and gifts received are not included in the income definition but are taxed under separate inheritance tax schedules. To avoid tax evasion through death-bed gifting, inter-vivos gifts are taxed like inheritances, typically cumulating gifts over several years.

In the canton of Bern, gifts and inheritances from the same donor are aggregated over five years. Inheritance taxes on spouses were abolished in 1989, and since 2006, no inheritance and inter-vivos gift tax is levied on direct descendants. The latter reform was adopted by the cantonal parliament in November 2004, making room for tax planning through delaying gifts until January 2006. For non-relatives, however, the top marginal tax rate has remained unchanged at 40%. Figure D2 illustrates the evolution of statutory tax schedules for different classes of heirs.

All transferred assets are subject to the inheritance and gift tax, including forgiven debt. In case of so-called mixed gifts, where there is an obvious mismatch between the price paid for an asset and its market value, a gift tax is levied on the gifted portion of the asset.

Transferred businesses (corporations, cooperatives, and holding companies) received a 50% tax reduction until 2013, and are completely exempt from the inheritance tax since 2014, as long as the heir is: (a) employed in the business in a managerial function and (b) a tax resident in the canton of Bern. In the case of holding companies, a majority participation in operating businesses of at least 40% (of the capital or the voting rights) is also required. All of the above requirements must be met for at least ten years after the transmission of the business, otherwise the tax reduction is forfeited and back-taxes are due.

Figure D2: Inheritance and gift tax rates, canton of Bern



Notes: The figures plot inheritance and gift tax rates on different classes of recipients for heirs/donees in the canton of Bern. 1st degree family includes siblings, parents, grandparents and common-law partners. 2nd degree family includes nieces/nephews, aunts/uncles and parents-in-law.

D2 Lottery players

A representative survey conducted in 2021 (Moneyland, 2021) revealed that 34% of the Swiss population play the traditional lottery (Lotto) at least several times a year, and 27% buy raffle tickets. Other forms of gambling – winnings from which also have to be declared as lottery wins – such as sports gambling, casino games, card games etc. are practised only by small fractions of the population. While cohorts aged 18–25 engage in a larger variety of types of gambling, older cohorts are more prone to playing the traditional lottery: 46% of those aged 50–74 play regularly.

These observations for Switzerland are broadly in line with findings on lottery players in Germany, where Lutter et al. (2018) find that 24.8% of respondents play the lottery at least a few times a year (15.9% [11.7%] play at least once a month [weekly]). Men are also found to play more often and to spend more than women. Higher-income survey respondents are more likely to play (but spend proportionally less of their income on lottery tickets). Respondents above the age of 59 play more regularly and spend more, both in absolute terms and relative to their income, than younger respondents.

Investigating the reasons to play the lottery, Lutter et al. (2018) find that the more one expresses a belief in good luck and daydreams about a positive future, the higher the odds of playing the lottery. This is in line with Kocher et al. (2014), who show that part of the value of playing the lottery are positive anticipatory emotions. In the same vein, in a large field experiment in the Netherlands Burger et al. (2020) find that lottery participation has a utility value in itself. In Lutter et al. (2018), work dissatisfaction is also significantly positively associated with the probability of playing the lottery at least a few times a year. Furthermore, a decline in income might be associated with a higher probability of playing the lottery. This could explain why we see more lottery wins as individuals approach retirement, a period when incomes typically start falling. We conclude from the literature on motivations to play the lottery that even though lottery players are self-selected, it is not necessarily selection of individuals with low-socioeconomic status: the psychological factors that determine whether someone plays the lottery apply to a wide range of the population.

D3 Pension system and retirement decisions

D3.1 The Swiss three-pillar pension system

The Swiss pension system is based on three pillars: pay-as-you-go social security pensions (first pillar), contribution-based occupational pensions (second pillar), and voluntary private pension savings plans (third pillar).

All labor incomes from employment and self-employment are fully subject to social security contributions. Occupational pension plans are mandatory above a legally defined minimal gross income (ranging between CHF 19,350 and CHF 24,750, or about 1/3 of the full-time median salary, in our sample period). Firms must provide a pension plan to their workforce. Workers cannot choose their pension plan. Minimum age-specific monthly contribution rates are set by law, but firms have some freedom to increase the rates and/or to contribute more than the employee.[59] Furthermore, individuals have the option for voluntary buy-ins to improve their future pensions. Because these buy-ins are tax-deductible, we observe them in our data.

The third pillar, finally, consists of private retirement savings accounts and life-insurances, respectively. Savings accounts are the predominant form, accounting for 64% of all capital in the third pillar in 2018 (Schüpbach and Müller, 2019).

Pension wealth in the second and third pillar is tax-exempt (and hence not part of our or any other individual-level register data), and annual contributions are deductible from taxable income. Tax deduction of voluntary contributions is capped at legally defined maximum amounts, both, in the second and third pillar.[60] Contributions to the third pillar are only tax-deductible for individuals who are employed or self-employed in a given year (while the second pillar, by definition, is only accessible to those in employment or self-employment).

[59] Tax data or any other administrative data lacks information on the specifics of an individual's occupational pension plan or the individual's amount of wealth saved in such a plan.

[60] The maximum buy-in amounts in the second pillar depend on the gap between an individual's projected pension and their current salary.

D3.2 Regular retirement

Across all three pillars, the statutory retirement age is 64 for women (63 before 2005) and 65 for men. Social security pensions are calculated based on average earnings and number of contribution years. To obtain the maximum pension, 44 contribution years are required for men and 43 for women (reflecting the difference in statutory retirement age).

Retirement savings from the second pillar can be drawn as annuitized pensions or they can be cashed out. Most pension plans also allow for a mix between capital withdrawals and a pension. Annuitization, however, is only possible if the individual is still employed at the time of (early or regular) retirement, i.e., those who become unemployed shortly before entering retirement only have access to their capital. Savings from the third pillar can typically only be withdrawn as lump-sum.

D3.3 Early and late retirement

Rules for early retirement differ by pillar, but are the same in all cantons and across all industries. Retirement can be also be deferred until age 70 in all three pillars.

In the first pillar, early retirement is possible up to 48 months prior to reaching the statutory retirement age. The pension is reduced accordingly, and early retirees still need to make social security contributions until they reach the statutory retirement age. The contribution is calculated based on their personal income and wealth. Especially for wealthy nonworking individuals (or married couples, if both retire early), these contributions can be hefty, as they also have to cover the part that is otherwise covered by the employer. Partial retirement is not possible in the first pillar. However, it is possible to retire early and start drawing a social security pension, and at the same time continue working part-time. In this case, social security contributions are covered through the employment contributions. Deferring retirement in the first pillar leads to an increase in later pensions. However, if individuals return to work once they have started drawing a pension, their pension is unaffected.

Occupational pensions can be drawn no earlier than at age 58 (and some pension plans only allow drawing the pensions starting at age 60).[61] In contrast to the first pillar, the second pillar allows for partial retirement. If labor supply is reduced by at least 20 or 30% (depending on the pension plan), the corresponding fraction can be drawn as a pension or cashed out. Partial retirement can be progressive: it is possible, for example, to go from full-time employment to 70% at age 62, reduce to 50% at age 63, and stop working at age 64. This strategy further allows to cash out the pension capital in several installments, which reduces the tax progression on these capital payments. Deferring retirement will increase the later pension, but rules vary by pension plan. Going back into work after having cashed out or annuitized the second pillar pension capital does not affect the occupational pension.

The pension capital from third pillar accounts can be withdrawn up to five years prior to reaching the statutory retirement age, i.e., at age 59 for women (age 58 up until 2004) and at age 60 for men. Typically, the capital is withdrawn, annuitization is extremely rare (and only available if a life insurance was bought). Individuals can return to work, in which case

[61] Provisions around early retirement differ by firm and pension plan. Employees at larger firms and top executives may benefit from more favorable conditions (Dorn and Sousa-Poza, 2005). In the construction sector, early retirement is possible at age 60 under a collective bargaining agreement (FAR). The bridging pension is financed by contributions from both employers and employees. Unfortunately, in the tax data, we lack information on the profession or firm. Our definition of early retirement is therefore too strict for some workers.

they become again eligible to make voluntary, tax-deductible contributions to the third pillar scheme. This is possible until age 70.

D Model derivations

A1 Baseline model

The lifetime budget constraint evaluated at time 0 writes:

$$b_{i,-1} + a_{i,0} + r_{i,0} + \sum_{a=0}^{D} \frac{\mathcal{W}_{i,a}}{(1+r)^a} = \sum_{a=0}^{D} \frac{c_{i,a}}{(1+r)^a} \tag{1}$$

where:

$$a_{i,0} = \sum_{a=0}^{T} \frac{w_{i,a} h_{i,a}}{(1+r)^a} \tag{2}$$

denotes active-life income evaluated at time 0, and:

$$r_{i,0} = \sum_{a=T+1}^{D} \frac{\overline{y}_{i,a}}{(1+r)^a} \tag{3}$$

stands for retirement income evaluated at time 0. Let us define λ_i as the marginal utility of wealth at time 0, then first-order conditions for consumption and labor supply imply:

$$u_{c,i,a} = \frac{\lambda_i}{\Lambda_a} \left[\frac{1+\rho}{1+r}\right]^a \tag{4}$$

$$-u_{h,i,a} = \frac{\lambda_i w_{i,a}}{\Lambda_a} \left[\frac{1+\rho}{1+r}\right]^a, \text{ if } a < T+1 \tag{5}$$

Let us now define the utility function as:

$$u\left(c_{i,a}, 1-h_{i,a}\right) = \log\left(c_{i,a}\right) + \kappa \log\left(1-h_{i,a}\right) \tag{6}$$

and replace to get:

$$c_{i,a} = \frac{\Lambda_a}{\lambda_i} \left[\frac{1+r}{1+\rho}\right]^a \tag{7}$$

$$\kappa \left(1-h_{i,a}\right)^{-1} = \frac{\lambda_i w_{i,a}}{\Lambda_a} \left[\frac{1+\rho}{1+r}\right]^a \tag{8}$$

Then, substitute the first one in the second to get:

$$\kappa \frac{c_{i,a}}{(1-h_{i,a})} = w_{i,a} \tag{9}$$

which is the usual labor supply equation and shows that labor supply depends negatively on consumption, and thus on age if consumption increases along the life cycle. Rearranging yields:

$$h_{i,a} = 1 - \kappa \frac{c_{i,a}}{w_{i,a}} \tag{10}$$

which, plugged in the expression of net earnings in the budget constraint gives:

$$b_{i,-1} + a'_{i,0} + r_{i,0} + \sum_{a=0}^{D} \frac{\mathcal{W}_{i,a}}{(1+r)^a} = \sum_{a=0}^{T} \frac{(1+\kappa)\, c_{i,a}}{(1+r)^a} + \sum_{a=T+1}^{D} \frac{c_{i,a}}{(1+r)^a} \tag{11}$$

where

$$a'_{i,0} = \sum_{a=0}^{T} \frac{w_{i,a}}{(1+r)^a} \tag{12}$$

Then, note that the FOC on consumption implies:

$$c_{i,a} = \mathbb{E}_0 \left\{ \frac{\Lambda_a}{\Lambda_0} \right\} \left[\frac{1+r}{1+\rho} \right]^a \frac{c_{i,0}}{\lambda_i}, \forall s \tag{13}$$

so that the RHS of the intertemporal budget constraint (11) writes:

$$\sum_{a=0}^{T} \frac{(1+\kappa)\, c_{i,a}}{(1+r)^a} + \sum_{a=T+1}^{D} \frac{c_{i,a}}{(1+r)^a} = c_{i,0} \frac{\mathbb{E}_0 \{\Gamma_0\}}{\lambda_i} \tag{14}$$

where:

$$\Gamma_0 = \sum_{a=0}^{T} \frac{(1+\kappa)}{(1+\rho)^a} \mathbb{E}_0 \left\{ \frac{\Lambda_a}{\Lambda_0} \right\} + \sum_{a=T+1}^{D} \frac{1}{(1+\rho)^a} \mathbb{E}_0 \left\{ \frac{\Lambda_a}{\Lambda_0} \right\} \tag{15}$$

Let us now wrap up and derive the expression for consumption using the intertemporal budget constraint:

$$c_{i,0} = \frac{\lambda_i}{\mathbb{E}_0 \{\Gamma_0\}} \mathbb{E}_0 \left[b_{i,0} + \sum_{a=0}^{T} \frac{w_{i,a}}{(1+r)^a} + r_{i,a} + \sum_{a=0}^{D} \frac{\mathcal{W}_{i,a}}{(1+r)^a} \right] \tag{16}$$

We can rewrite this expression for any a:

$$c_{i,a} = \frac{\lambda_i}{\mathbb{E}_a \{\Gamma_a\}} \mathbb{E}_a \left[b_{i,a-1} + a'_{i,a} + r_{i,a} + \sum_{s=0}^{D-a} \frac{\mathcal{W}_{i,a+s}}{(1+r)^s} \right] \tag{17}$$

where λ^i now denotes the marginal utility of wealth at time a, and where:

$$r_{i,a} = \sum_{s=T-a}^{D} \frac{\overline{y}_{i,a+s}}{(1+r)^s}, \; a'_{i,a} = \sum_{s=0}^{T-a} \frac{w_{i,a+s}}{(1+r)^s}, \tag{18}$$

After assuming that $\Lambda_a = 1, \forall a \leq T$, and using the definition of Λ_a:

$$\Gamma_a = \frac{(1+\kappa)}{\rho} \left(\frac{(1+\rho)^{T-a} - 1}{(1+\rho)^{T-a}} \right) + \sum_{s=T-a}^{D} \frac{\mathbb{E}_a \{\varsigma_{a+1} ... \varsigma_{a+s}\}}{(1+\rho)^s} \tag{19}$$

Finally, we can write earnings as $\mathcal{Y}_{i,a} = w_{i,a} h_{i,a}$ and plug the expression for $c_{i,a}$ to get:

$$\mathcal{Y}_{i,a} = \underbrace{w_{i,a}}_{i+a \text{ FE}} - \frac{\kappa \lambda_i}{\mathbb{E}_a \{\Gamma_a\}} \mathbb{E}_a \left[\underbrace{b_{i,a-1} + a'_{i,a} + r_{i,a}}_{\text{Init. wealth + wage + ret. income}} + \underbrace{\sum_{s=0}^{D-a} \frac{\mathcal{W}_{i,a+s}}{(1+r)^s}}_{\text{Exogenous wealth shocks}} \right] \tag{20}$$

Focusing on percentage changes in $\mathcal{Y}_{i,a}$ as a function of potential changes in $\mathcal{W}_{i,a+s}$, the above expression implies:

$$\frac{\Delta \mathcal{Y}_{i,a}}{\mathcal{Y}_{i,a}} = -\mathbb{E}_a \left\{ \frac{\kappa \lambda_i}{\Gamma_a (1+r)^s} \frac{\Delta \mathcal{W}_{i,a+s}}{\mathcal{Y}_{i,a}} \right\}. \tag{21}$$

In the main text, we define the structural elasticity ζ_a^{struct} as the log earnings gap at time a between the observed and no-shock paths:

$$\zeta_a^{struct} = \frac{\log \mathcal{Y}_{i,a} - \log \mathcal{Y}_{i,a}^{ns}}{\log \mathcal{W}_{i,a}}. \tag{22}$$

Consistent with our empirical approach, we also define the impact elasticity ζ_a^{impact} as the *observed* impact of a wealth shock $\mathcal{W}_{i,a}$ on the five-year log change in earnings, relative to the no-shock counterfactual:

$$\zeta_a^{impact} = \frac{(\log \mathcal{Y}_{i,a} - \log \mathcal{Y}_{i,a-1}) - (\log \mathcal{Y}_{i,a}^{ns} - \log \mathcal{Y}_{i,a-1}^{ns})}{\log \mathcal{W}_{i,a}}. \tag{23}$$

These two elasticities are related by:

$$\zeta_a^{struct} = \zeta_a^{impact} + \frac{\log \mathcal{Y}_{i,a-1} - \log \mathcal{Y}_{i,a-1}^{ns}}{\log \mathcal{W}_{i,a}}. \tag{24}$$

The second term on the RHS captures the anticipatory earnings response occurring before the shock. If the shock is unexpected, then $\mathcal{Y}_{i,a-1} = \mathcal{Y}_{i,a-1}^{ns}$ and $\zeta_a^{struct} = \zeta_a^{impact}$. However, when the shock is anticipated from time $a = 0$, it enters the definition of permanent income from the start. In that case, we can express the anticipatory correction term using the model structure. From Equation (8), we have:

$$\mathcal{Y}_{i,a} = w_{i,a} - \frac{\kappa \lambda_i}{\Gamma_a} \mathrm{Y}_{i,a}. \tag{25}$$

If $\mathcal{W}_{i,a}$ was anticipated at time $a-1$, then $\mathrm{Y}_{i,a-1}$ includes the term $\mathcal{W}_{i,a}/(1+r)$ which implies a change in earnings at time $a-1$ – compared to a no-shock situation – of:

$$\log \mathcal{Y}_{i,a-1} - \log \mathcal{Y}_{i,a-1}^{ns} \approx -\frac{\kappa \lambda_i \mathcal{W}_{i,a}}{\Gamma_{a-1}(1+r)\mathcal{Y}_{i,a-1}^{ns}}. \tag{26}$$

Substituting this into the relation between the elasticities yields:

$$\zeta_a^{struct} \approx \zeta_a^{impact} - \frac{\kappa \lambda_i \mathcal{W}_{i,a}}{\Gamma_{a-1}(1+r)\mathcal{Y}_{i,a-1}^{ns} \log \mathcal{W}_{i,a}} \tag{27}$$

This expression quantifies the difference between the empirical and structural elasticities due to anticipation. It depends on the relative preference for leisure (κ), the marginal utility of wealth (λ_i), the age-specific discount factor (Γ_{a-1}), the interest rate (r), and the size of the wealth shock relative to prior earnings.

A2 An extension with early retirement

Baseline case. We now extend the model by allowing individuals to opt for early retirement (ER). Specifically, we solve the life-cycle model in two alternative cases: (a) one where individual i retires at $T+1 = 65$ as in the simple model above, and (b) one where individual i retires one period earlier, at $T = 60$, which implies a different future path of income. We then compute the forward-looking value functions associated with each option, and we let individual i choose the value-maximizing path. Because the model is forward-looking, we consider that the

choice of retiring early is irreversible: once individual i has chosen to retire early, she remains on that path for subsequent periods.

We denote variables pertaining to the ER decision case with an asterisk. When individual i decides to retire early (at age $a = T$), we endow her with a fraction $\theta < 1$ of the retirement income she would have got had she delayed retirement until age $a = T + 1$, i.e. $\overline{y}^*_{i,T} = \theta \overline{y}_{i,T+1}$; and we then apply the same penalty θ to later retirement income, $\overline{y}^*_{i,T+a} = \theta \overline{y}_{i,T+a}$ for $a = 1, ..., D - T$. In other words, retiring early involves a permanent financial penalty. The associated drop in income can be smoothed using wealth but still implies adjusting consumption over time. In exchange of these costs, early retirees derive utility from additional leisure. Finally, we assume that individuals become aware of the option to retire early only from age 50 onwards.

Formally, let $\left\{\bar{y}_{i,a}, \bar{y}^*_{i,a}\right\}$ denote the exogenous income paths respectively associated with retiring at the statutory age and with the ER decision. We solve both models $\mathcal{M} = \{c_{i,a}, h_{i,a}, b_{i,a}\}$ and $\mathcal{M}^* = \left\{c^*_{i,a}, h^*_{i,a}, b^*_{i,a}\right\}$ conditional on income paths, compute value functions $\left\{V_{i,a}, V^*_{i,a}\right\}$, and define an indicator function $\mathbb{1}^r_{i,a} = (V^*_{i,a} > V_{i,a})$ if $a \geq 50$ and $\mathbb{1}^r_{i,a} = 0$ otherwise.[1] The resulting solution path is then given by:

$$\tilde{c}_{i,a} = \mathbb{1}^r_{i,a} c^*_{i,a} + (1 - \mathbb{1}^r_{i,a}) c_{i,a} \tag{28}$$

$$\tilde{h}_{i,a} = \mathbb{1}^r_{i,a} h^*_{i,a} + (1 - \mathbb{1}^r_{i,a}) h_{i,a} \tag{29}$$

$$\tilde{b}_{i,a} = \mathbb{1}^r_{i,a} b^*_{i,a} + (1 - \mathbb{1}^r_{i,a}) b_{i,a} \tag{30}$$

$$\mathbb{1}^r_{i,a} = (V^*_{i,a} > V_{i,a}) \text{ if } a \geq 50 \text{ and } 0 \text{ otherwise} \tag{31}$$

To run simulations, we need to assign a value to the new parameter θ. In Switzerland, the penalty for early retirement is 6.8% per year.[2] Based on early retirement rates over the last 20 years, we compute the average penalty faced by early retired individuals – computing the average retirement age for people between 60 and 64 – and obtain 20%, which implies $\theta = 0.8$.[3]

Panel (a) of Figure A1 shows that the ER decision implies a drop in income due to the early retirement penalty, which then lasts for the whole retirement period.

Early retirement also leads individuals to consume more and to supply less labor – and thus to accumulate less wealth – in the periods *before* they actually retire. Upon early retirement, they cut consumption by more than when waiting for the statutory retirement age, which results in larger wealth from 60 to 70, but faster wealth depletion upon deciding to retire early. While facing a permanent income penalty, early retirees enjoy more leisure in period $T = 60$, which implies that the value of the ER decision is always above the value of working until the statutory retirement age. Hence, in this baseline model, individuals choose to retire early.

Panel (b) of Figure A1 reports the impact and cumulative response of earnings upon receiving a wealth shock in the ER case and compares it with the case of retirement at the statutory age.

By assumption, the *impact* response of earnings is not affected by ER when wealth shocks hit before 50. Furthermore, the response to shocks hitting at or after 50 is magnified. The main

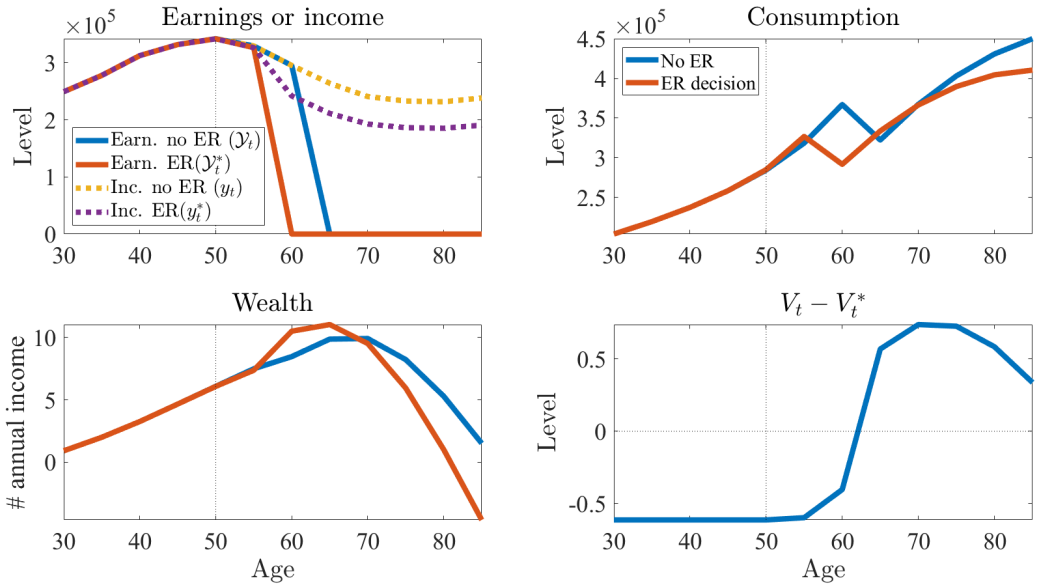
[1] Solving for $h_{i,a}$ and $h^*_{i,a}$ is the same as solving for $y_{i,a}$ and $y^*_{i,a}$.

[2] Source: https://www.ahv-iv.ch/p/3.04.e.

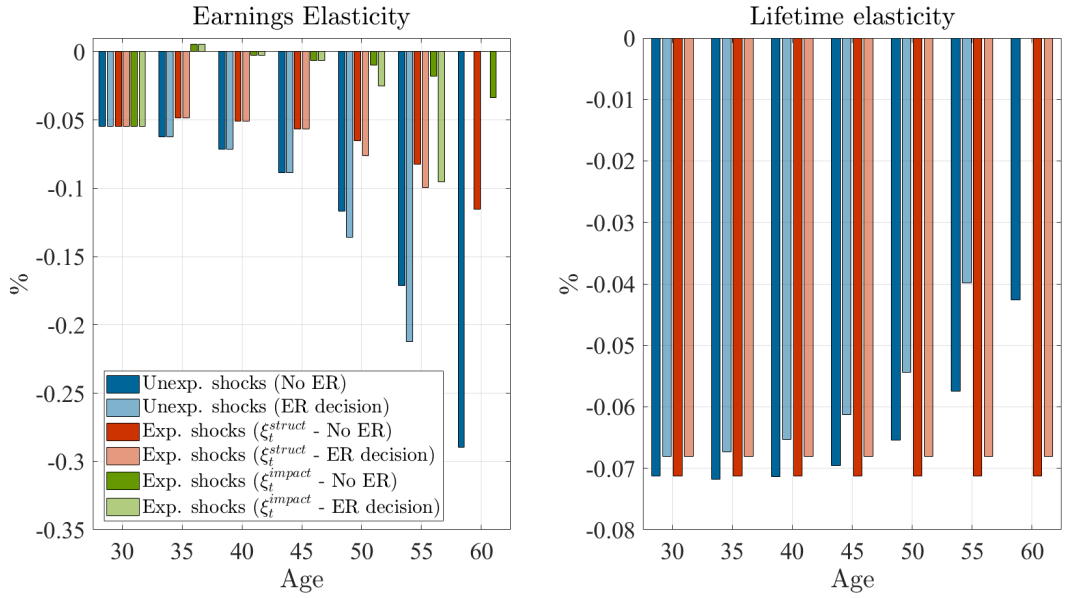
[3] Average early retirement rates for people between 60 and 64 are computed using 2010-11, 2012-2014, 2015-2017 and 2018-2020 survey data ("Enquête suisse sur la population active"). We obtain an average rate of 20%.

Figure A1: An extension with early retirement

(a) Life-cycle profiles



(b) Changes in earnings



Notes for Panel (a): Based on our calibration, earnings/hours are computed using Equation (8), consumption using equation (7), wealth b_t using equation (5) and value function V_t using equation (3). People who reach their 90th year die with certainty with zero wealth.
Notes for Panel (b): The size of the shock is normalized to represent one year (1/5 periods) of the earnings at age 30, and present-value equivalent. Impact elasticities are computed as log-deviations of earnings divided by the log of the wealth shock. Recall that in the case of unexpected shocks, $\xi_a^{ns} = \xi_a$. Lifetime elasticities are computed by taking the log-difference in lifetime sums of earnings divided by the log-size of the shock received at 30.

reason is that, in the calibration illustrated in Figure A1, individuals always choose to retire early when given the option. Compared to the baseline model without ER, they supply less labor ahead of their effective retirement decision, which makes their labor supply more elastic between 50 and 60 compared to the case of retirement at the statutory age. The model thus predicts a *larger* negative response of earnings after 50 to unexpected wealth shocks when individuals retire early than under statutory-age retirement. Last, since individuals always choose to retire early, earnings are unaffected at age 60 since they do not work anymore. The cumulative effects are potentially mixed. With ER decision, labor supply becomes more elastic between 50 and 60 so that wealth shocks affect earnings more then under statutory-age retirement, which implies a stronger elasticity effect. However, labor supply is affected for one period less, which reduces the duration effect. The second effect turns out to dominate quantitatively, so that the cumulative earnings response is always lower with ER than without.

Introducing a bequest motive. A striking feature of early retirement as shown in Figure A1 is that individuals choosing this option end up giving up a lot of their wealth at the end of their lives to smooth lifetime consumption, in comparison to the case of retirement at statutory age. This implication of the baseline model with early retirement may be considered unrealistic for at least two reasons. First, wealth may be illiquid – e.g., in the form of housing – and therefore unsuitable for consumption smoothing.[4] Second, our baseline calibration implies that early retired individuals end up with zero or even slightly negative wealth, which is inconsistent with the data shown in Figure 8, and indeed with the very existence of wealth shocks from bequests.

Introducing a (separable) bequest motive into the log-log utility function of our model would not directly interact with consumption and savings decisions, because wealth would not affect the marginal utility of consumption. Yet, a bequest motive can contribute to shaping the ER decision by altering value functions of the two options – early or statutory-age retirement. Following De Nardi (2004), we therefore consider a "warm glow" variant of the model modifying the utility function to:

$$u\left(c_{i,a}, 1-h_{i,a}, b_{i,a}\right) = \log\left(c_{i,a}\right) + \kappa \log\left(1-h_{i,a}\right) + \omega \log\left(\mu + b_{i,a}\right). \tag{32}$$

With this specification, individuals derive utility from wealth/bequests above a certain level μ, which governs the extent to which bequests are luxury goods.[5] For illustrative purposes, we calibrate μ to average net wealth, and $\omega = 0.4$, implying that individuals retire at the statutory age in steady state but choose ER upon receiving the wealth shocks we already considered. Other parameters remain unchanged.

A3 Allowing for heterogeneous agents

Unequal bequest motives. Given the potential importance of early retirement in shaping the overall earnings response, we need to take a stand on how to treat extensive-margin responses. In our extended model with early retirement, all individuals choose to retire early when given the opportunity to do so. With a bequest motive and an arbitrary value of utility parameters

[4] We abstract here from practical possibilities to make housing wealth liquid, such as life annuities or reverse mortgages.
[5] For evidence on bequests as a luxury good, see De Nardi et al. (2025).

(ω and μ), only individuals receiving wealth shocks retire early. In reality, not all individuals will retire early, even after receiving a wealth shock close to the statutory retirement age. We therefore now consider a heterogeneous-agent version of the model in which ω, the parameter that governs bequest motives, is distributed log-normally, i.e. $\exp(\omega) \sim \mathcal{N}(\overline{\omega}, \sigma_\omega^2)$. We define $\Theta(\omega)$ as the resulting distribution of ω.

Let $\mathcal{Y}_a(\omega)$ denote earnings at age a of an agent ω resulting from the optimal choice given by the model of Section 4. At age a, every agent faces an age-specific probability p_a of inheriting, and the unconditional probability of inheriting over the course of one's working-age life is $\pi = \sum_{a=0}^{t=T} p_a$, where $a = 0$ again corresponds to age 30 and $a = T$ to age 65. If individual ω does not receive an inheritance, her earnings are simply $\mathcal{Y}_a(\omega)$.

If individual ω receives an expected wealth shock, under rational expectations, her life-time response is $\mathcal{Y}_a^{exp}(\omega)$ and is independent of the age at which the shock is effectively received. In this case, aggregate earnings can be written as:

$$\mathcal{Y}^{exp} = \sum_{t=0}^{a=T} n_a \int \left[\pi \mathcal{Y}_a^{exp}(\omega) + (1-\pi)\mathcal{Y}_a(\omega)\right] \Theta(\omega) d\omega, \tag{33}$$

where n_a is the weight of individuals aged a in total population. For a given ω, earnings at age a are a weighted average of the response at age a knowing a shock will occur at some point in time – which depends on age a but not on the age at which the shock hits – and the change in earnings at age a knowing there will be no shocks. For each age group the responses are integrated over the distribution of ω, and the aggregate response is the weighted average of total responses by age groups.

If instead shocks are unexpected, average earnings at age a for agent ω are:

$$\mathcal{Y}_a^{uxp}(\omega) = p_a \mathcal{Y}_{a,a}^{uxp}(\omega) + (1-p_a)\left[\sum_{s=0}^{s=T-1} p_s \mathcal{Y}_{a,s}^{uxp}(\omega) + (1 - \sum_{s=0}^{s=T-1} p_s)\mathcal{Y}_a(\omega)\right], \tag{34}$$

where $\mathcal{Y}_{a,s}^{uxp}$ denotes earnings at age a for wealth shocks received at age s. This expression is a composite of (a) the current response to wealth shocks hitting at age a weighted by the probability of receiving at that age, (b) the *current* response to *past* shocks weighted by their probabilities of occurrence and (c) the *current* response in absence of past shocks weighted by the probability of not receiving until age a. Aggregate earnings can then be written as:

$$\mathcal{Y}^{uxp} = \sum_{a=0}^{t=T} n_a \int \mathcal{Y}_a^{uxp}(\omega)\Theta(\omega) d\omega. \tag{35}$$

Both measures of aggregate earnings can also be computed without allowing for the option of retiring early, which provides an interesting alternative case.

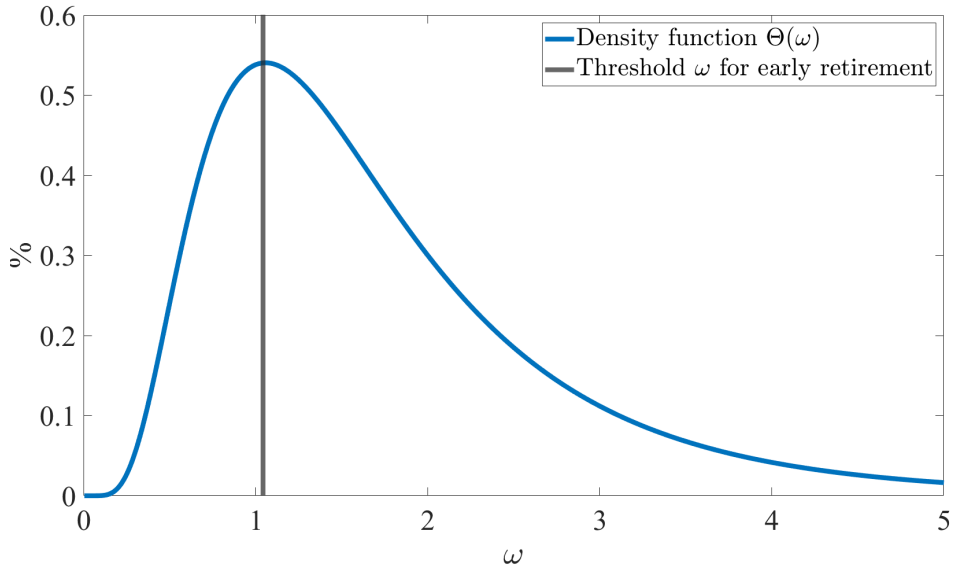
Calibration. Before running counterfactual experiments, parameters of the model need to be calibrated. Unless stated otherwise, we use the same parameter values as in Section 4.

First, age-group weights n_a and amounts inherited can be taken directly from the data (see Table 2). Second, age-specific probabilities of receiving an inheritance shock p_a are computed based on the probabilities of inheriting in Table 2 and normalized so that the unconditional

probability of receiving over the life cycle is equal to π. We further normalize π so that the proportion of total inheritance flows represents 13.2% of aggregate GDP – which is total earnings divided by the labor share (0.65) in our model, as estimated on Swiss data by Brülhart et al. (2018), which implies $\pi = 0.875$.

Last, three parameters remain to be set: the extent to which bequests are luxury goods μ, and the mean and standard deviation of the log-normal distribution of ω. Regarding μ we keep our assumption that it equated the average net wealth. Regarding ω, recall that it governs early retirement decisions by affecting the weight of net wealth in the utility function. We set the mean $\overline{\omega}$ and standard deviation σ_ω of the log-normal distribution so as to match two moments of the data: (i) the average early retirement rate, which is 27.7% and (ii) the average wealth-income ratio at age 60, which is 6.3 in our data.[6] We obtain $\overline{\omega} = 1.4939$ and $\sigma_\omega = 0.5875$, which produces the distribution reported in Figure A2. Compared to the illustrative value of $\omega = 0.4$ used in Section 4, this means that the *average* agent has a much stronger bequest motive and needs to receive a much larger wealth shock than one year of labor income to retire early. The variance σ_ω is relatively large however, signaling that the sensitivity of early retirement decisions is quite heterogeneous.

Figure A2: Calibrated log-normal distribution of the wealth-in-utility parameter ω



Notes: The vertical line indicates the threshold value above which individuals choose *not* to retire early.

[6] In the model we consider the early retirement rate when wealth shocks are treated as expected. We compute the average early retirement rate between 60 and statutory retirement age (which differs for men and women) based on OFS data.