

Intended and Accidental Bequests in a Life-cycle Economy

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What fraction of bequests is accidental vs. intended?

Motivation:

Bequest motives matter for policy analysis in earlier research.

Examples: Ricardian equivalence
Capital income taxation

Questions:

Are most bequests accidental or intended?

Does it matter for policy analysis how bequests are modeled?

The Approach

Augment a standard life-cycle model to accommodate:

- Accidental bequests
- Altruistic or Joy-of-giving bequests

Key model features:

- Labor endowment process matches earnings and wealth distribution
- Random mortality and lack of annuities markets

Bequest motives are parameterized to match U.S. aggregate inheritances.

Intended bequests are measured by comparing altruistic with selfish parents.

Main Findings

Accidental bequests account for at least half, and perhaps all, of observed bequests.

In U.S. data, aggregate inheritances around 2% of GDP

- Plausible range: 1.5% to 2.65% of GDP

With only accidental bequests, model implies inheritances of **1.5%** of GDP. This matches 1989 SCF.

If bequest motive is parameterized to match 2.65% of GDP: accidental bequests account for **47%** of total bequests.

Bequest motives have only **weak implications** for other observations sometimes interpreted as evidence for/against accidental bequests:

- Small share of annuitized private wealth.
- Emergence of large estates.
- Rates of dissaving during retirement.

Policy Experiments

Are the outcomes of policy experiments robust to alternative assumptions about bequest motives?

Effects of taxing **capital income** are nearly unaffected by bequest motives.

Bequest motives have small effects on **labor income** tax.

Tax effects are much weaker than in previous literature.

The reason is that, in the data and in the model, most households do not leave bequests to their children.

In previous models, all households left bequests and all bequests were intended.

THE MODEL

Extension of Auerbach and Kotlikoff (1987) that includes:

- Finite lifetimes
- Random earnings (precautionary saving)
- Earnings process is adjusted to match wealth distribution
- Stochastic lifetimes (accidental bequests)
- Altruistic or joy-of-giving bequests

Consider only steady states

Households

Each dynasty consists of a sequence of households

Household **state vector**: $s = (a, k, e, \psi, q)$

- Households live through $a = 1, \dots, A$ "ages" that last a random number of periods
- k : asset holdings
- e : transitory labor endowment
- q : permanent labor endowment (persistent across generations)
- ψ : bequest intensity

At the beginning of life:

- Start at age $a = 1$.
- Draw (q, ψ) , which remain fixed for life.
- Receive inheritance k .
- Draw labor endowment e .

At the end of the period:

- Death with probability ϕ_a .
- Move to age $a+1$ with probability μ_a .

Household Dynamic Program

$$\begin{aligned} V(a, k, e, \psi, q) = \max u(c) \\ + (1 - \phi_a) \beta \sum_{e'} V(a, k', e', \psi, q) \Omega_a(e, e') \\ + \phi_a (1 - \mu_a) \beta \sum_{e'} V(a + 1, k', e', \psi, q) \Omega_{a+1}(e, e') \\ + \psi \phi_a \mu_a \beta \sum_{q'} \Lambda(q, q') \sum_{e'} \Omega_0(e, e') \sum_{\psi'} \Psi(\psi') \hat{V}(k', e', \psi', q') \end{aligned}$$

subject to the budget constraint

$$k' = (1 + r)k + wh_a e q - c(s) + \tau(s)$$

and the borrowing constraint $k' \geq 0$

Value of leaving a bequest

Joy-of-giving: $\hat{V}(k', \cdot) = b(k')^{1-\sigma^*} / (1 - \sigma^*)$

Altruism: $\hat{V}(k', e', \psi', q') = V(1, b(k'), e', \psi', q')$

Inheritances: $b(k) = (1 - \tau_b) k (1 + r)^{-T_G}$

Children know the value of their future inheritance and can borrow against it.

Firms

$$\max F(K, L) - r^G K - w^G L$$

Government

Impose capital and labor income taxes:

- $r = (r^G - \delta) (1 - \tau_k)$
- $w = w^G (1 - \tau_w)$

Transfers:

- $\tau(s) = 0$ if $a(s) \leq a_R$
- $\tau(s) = \tau_R$ otherwise

Government budget constraint:

$$G + \int \Theta(s) \tau(s) ds = \tau_w w^G L + \tau_k (r^G - \delta) K + \tau_b B$$

Competitive Equilibrium

A stationary competitive equilibrium consists of

- aggregates (K, C, G) ,
- a price system (r^G, w^G) ,
- a value function (V) ,
- policy functions (c, κ) ,
- and a distribution over household types, $\Theta(s)$,

such that:

- The policy functions and value function solve the household problem.
- Firms maximize profits.
- Markets clear.
- The government budget is balanced.
- The distribution of household types is stationary.

Model Parameters

Households

$\beta = 0.9614$ Matches $K/Y = 2.9$

$\sigma = 2$

Demographics

$A = 12$ Number of life-cycle phases

$a_R = 3$ Three work phases, corresponding to ages 20-65

μ_a Matches mortality rates of couples. Social Security Administration, Period Life Tables 1997

ϕ_a Matches mean phase length of 15 years for work life and 3 years for retirement

$T_G = 30$ Children are born 30 years before parents die

Firms

$\alpha = 0.3$ Capital income share in NIPA

$\delta_k = 0.063$ Matches after-tax interest rate of 4%

Ξ Normalized such that $w^G = 1$

Government

$\tau_w = 0.4$ Trostel (1993)

$\tau_k = 0$

$\tau_b = 0.25$ See text

τ_R Set to 40% of mean household earnings

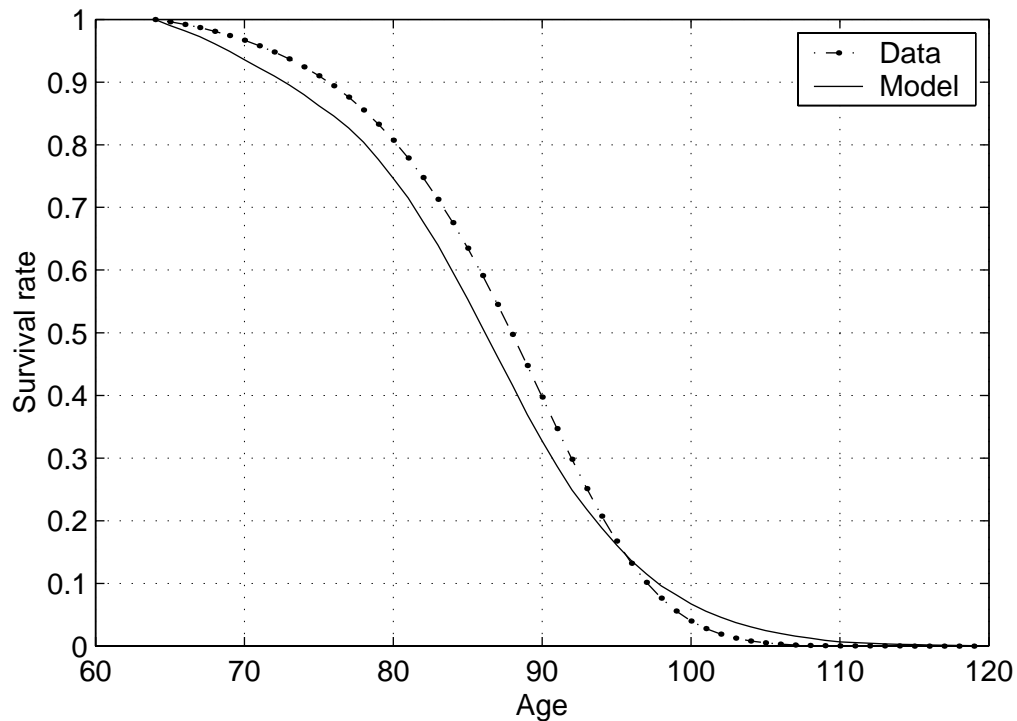


Figure 1: Survival rates

Labor Endowments

Transitory endowment process approximates AR(1)
 estimated from PSID

Permanent endowment process approximates AR(1)
 Parameters match earnings Gini and intergenerational persistence

Top transitory endowment matches fraction of wealth held by
 richest 5% of households

FINDINGS

If all bequests are accidental:

- Aggregate inheritances / output = **1.5%**
- Model matches 1989 SCF bequest flows, but falls short of some estimates in the literature (up to 2.65%).

Size of bequest flows is **robust** against:

- Household risk aversion ($\sigma = 1$ or $\sigma = 4$)
[But altruism parameter ψ is sensitive]
- Transfer income
- Deterministic aging

Matching **mortality** rates of female individuals implies inheritance/output ratio = **2.5%**

Why are accidental bequests so large?

Households in the top retirement wealth decile consume **40** times more than retirement transfers.

Their **marginal utility** rises by factor **1,600** when running out of assets.

Richest households sacrifice around **15%** of retirement wealth to insure against running out of assets at old age.

Rich households would be indifferent between holding bonds and holding **annuities** at conditions observed in U.S. data.

Measuring Accidental Bequests

Accidental bequests are smaller than some empirical estimates.

What fraction of bequests is accidental when preferences match inheritance/output ratio = 2.65%?

Intended bequest = difference in bequests between altruistic and selfish households.

Finding: **47%** of bequests are accidental.

Fraction of accidental bequests is **robust** against variations in risk aversion and transfer income.

Matching **mortality** rates of female individuals implies that **76%** of bequests are accidental.

Conclusion:

At least half, and perhaps all, of observed bequests are accidental.

Other Evidence: Size Distribution of Inheritances

Table 5

Percentile class	70	80	90	95	98	100
SCF	0.0	1.8	9.4	18.9	30.8	100.0
PSID	0.0	0.2	5.6	15.4	33.2	100.0
Accidental bequests	0.5	3.2	13.6	29.5	50.8	100.0
Joy-of-giving	26.5	32.8	44.4	56.2	70.0	100.0
Altruism	1.5	5.3	15.5	30.3	51.7	100.0
Altruism. $\psi = 1$	1.7	7.4	19.8	34.2	54.5	100.0

Intended bequests do not help account for the observed concentration of inheritances.

In the data, 2% of households receive almost 70% of inheritances.

Dissaving in Retirement

Table 7

Model	First decade	Second decade
No bequest	-15.1	-36.9
Accidental bequests	-14.6	-37.0
Joy-of-giving	-4.8	-16.9
Altruism	-7.9	-21.7
Altruism. $\psi = 1$	2.5	1.2

All models imply dissaving within the range of empirical estimates
[0 to 15% during first decade of retirement]

But: Parents dissave more slowly than non-parents (17% vs. 6%).
Hurd (1987) finds no difference in HRS.

Bequest motives also don't matter much for

- Intergenerational persistence
- Retirement wealth distribution
- Wealth inequality by age

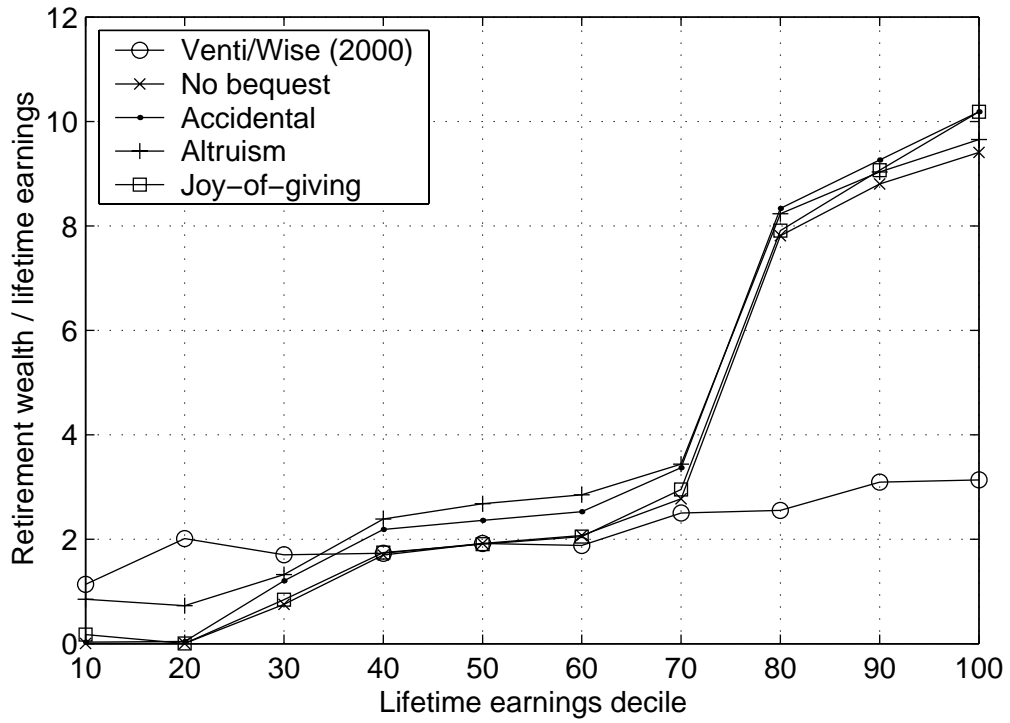
Wealth distribution at retirement

Percentile class	20	40	60	80	90	95	100	≤ 0	Gini
SCF	-7.3	-5.0	0.9	13.7	28.5	40.8	100.0	7.0	0.91
No bequests	0.0	1.8	5.8	20.9	38.7	54.8	100.0	0.3	0.76
Accidental bequests	0.1	2.5	7.1	22.9	40.8	57.0	100.0	0.1	0.74
Joy-of-giving	0.6	3.4	8.5	24.0	41.3	56.9	100.0	0.0	0.73
Altruism	0.1	2.0	5.9	21.2	39.1	55.7	100.0	0.1	0.76
Altruism. $\psi = 1$	0.0	1.3	4.0	18.0	35.8	52.3	100.0	0.1	0.79

Intergenerational persistence

	Wealth	Consumption
Data	0.32-0.54	0.68-0.72
No bequests	0.22	0.39
Accidental bequests	0.22	0.43
Joy-of-giving	0.29	0.43
Altruism	0.23	0.44
Altruism. $\psi = 1$	0.25	0.44

Retirement Wealth and Lifetime Earnings



POLICY EXPERIMENTS

How do intended bequests modify the outcomes of tax experiments?

Existing results:

- Altruistic bequests magnify effects of capital income tax (Engen et al. 1997); Hendricks 2000).
Intuition: Infinite interest elasticity of savings prevents stabilizing change in interest rate.
- Altruism reduces the effects of labor income taxes.
Intuition: Infinite interest elasticity of savings fixes capital stock.
- Key assumption: all households leave bequests.

Next:

Re-examine tax effects in models that generate a more realistic inheritance distribution.

Capital Income Tax

Experiment:

Levy a 10% capital income tax. Discard revenues.

Table 8

Model	Output	Wealth Gini
No bequest	-1.31	0.00
Accidental bequests	-1.37	0.01
Joy-of-giving	-1.35	0.01
Altruism	-1.36	0.00
Altruism. $\psi = 1$	-1.43	0.00

Bequest motives play only a small role for capital income tax.

Intuition:

Tax elasticity of saving depends on length of horizon (Abel 1985).

Here: Horizon is determined by number of successive cohorts linked by positive bequests.

This number is small (roughly 2 on average), even with intended bequests, because 70% of households do not leave bequests.

Labor Income Tax

Experiment:

Levy a 10% labor income tax. Discard revenues.

Labor income tax has **no effect** on output, if **all** households leave altruistic bequests (or if households are infinitely lived).

Table 9

Model	Output	Wealth Gini
No bequest	-3.26	-0.01
Accidental bequests	-3.27	-0.01
Joy-of-giving	-3.18	-0.01
Altruism	-2.78	0.02
Altruism. $\psi = 1$	-2.43	0.06

Tax effects are very similar for accidental and joy-of-giving bequests.

Strong altruism reduces tax effects (higher interest elasticity of saving).

Assuming that all households are linked by altruistic bequests is a poor approximation.

CONCLUSION

At least half, and perhaps all, of observed bequests are accidental.

Bequest motives play only a small role for outcomes of income tax experiments.

This contrasts with models where all households leave bequests.

Extensions:

Data on inter-vivos transfers

Accounting for intergenerational wealth persistence