

Type Dependence and Scale Dependence in Top Wealth Concentration

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October 2026

1. Introduction

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The top 10 percent in the U.S. hold 69 to 77 percent of aggregate wealth.

Saez and Zucman (2016), Kuhn, Schularick and Steins (2020), Smith, Zidar and Zwick (2023)

Two worlds fit this wealth concentration:

1. **Type dependence:** some households keep an advantage and pull away
2. **Scale dependence:** no advantage lasts, growth depends only on wealth and luck

Same wealth distribution, opposite stories about opportunity.

1. Introduction

Their relative importance matters for policy.

- The optimal wealth tax flips sign between the two (Gaillard and Wangner 2023)
- Yet models do not identify it from wealth data
- Some assume the type's persistence (Hubmer, Krusell and Smith 2021)
- Others calibrate it to flows in and out of entrepreneurship (Gaillard et al. 2024)

1. Introduction

Three theoretical results and one quantitative result.

1. Wealth inequality and one-period wealth mobility **cannot identify** persistence
2. With i.i.d. labor income, **wealth over several periods** reveals a persistent type
3. **Persistent labor income** reproduces the shape of a permanent type's profile
4. Fitted model: **scale dependence** leads unless the type is very persistent and wide

1. Introduction

This paper relates most closely to two studies.

- **Gaillard and Wangner (2023):** both worlds give nearly the same distribution
- This paper: with i.i.d. labor income, the two distributions are identical
- **Benhabib et al. (2022):** only a permanent type fits dynastic wealth mobility
- This paper: persistent labor income alone keeps wealth persistent at long horizons

1. Introduction

Related literature.

- **State dependence and unobserved heterogeneity:** Heckman (1981), Shorrocks (1976)
- **Calibrated models of top wealth concentration:** Krusell and Smith (1998), Quadrini (2000), Cagetti and De Nardi (2006), Benhabib, Bisin and Zhu (2011), Cao and Luo (2017), Benhabib, Bisin and Luo (2019), Hubmer, Krusell and Smith (2021), Gaillard and Wangner (2023), Gaillard et al. (2024)
- **Wealth taxation with persistent returns:** Gaillard and Wangner (2023), Guvenen et al. (2023)

2. Random growth models of wealth

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Next period's wealth is current wealth times a growth factor, plus labor income.

$$w_{i,t+1} = a_{it} w_{it} + \varepsilon_{i,t+1}$$

- **Scale dependence:** the growth factor is drawn afresh each period
- **Type dependence:** the growth factor carries a persistent household type
- The type's persistence ρ : $\rho = 0$ is scale dependence, $\rho > 0$ type dependence

2. Random growth models of wealth

The model I fit nests both mechanisms in the type's persistence.

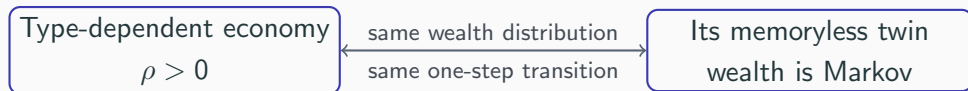
$$a_{it} = \underbrace{\theta_{it}}_{\text{type}} \cdot \underbrace{g(w_{it})}_{\text{wealth gradient}} \cdot \underbrace{\eta_{it}}_{\text{memoryless shock}}$$

- $\rho = 0$: scale dependence. $\rho = 1$: a permanent type
- Labor income: a fixed effect, a persistent component and a transitory shock

3. Identification of the type's persistence

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Wealth inequality and one-period wealth mobility contain no information on the type's persistence.



- Every type-dependent economy has a **memoryless twin**
- With i.i.d. labor income, the twin is **scale-dependent**

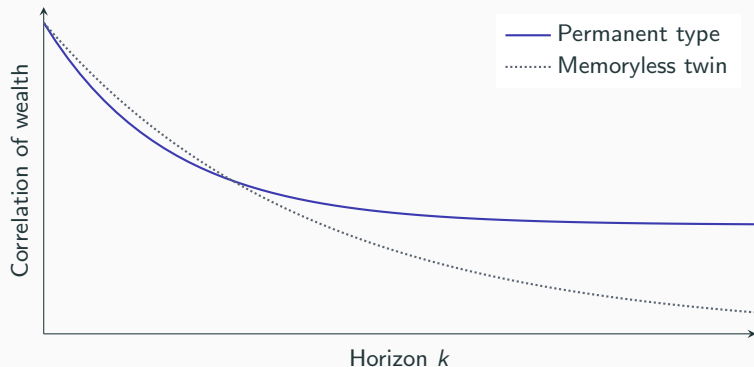
3. Identification of the type's persistence

With i.i.d. labor income, wealth over several periods reveals a persistent type.

- A persistent type makes wealth **non-Markov**
- **Wealth mobility profile:** the correlation of wealth now and k periods later
- Permanent type: the profile converges to a **positive limit**
- Memoryless twin: the profile converges to **zero**

3. Identification of the type's persistence

The wealth mobility profile, with a permanent type and in its memoryless twin.



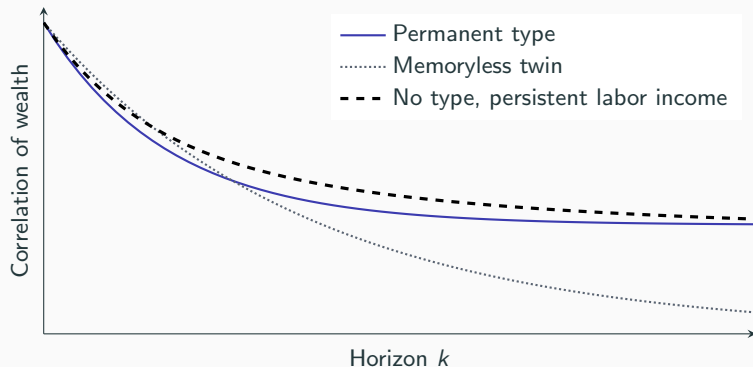
3. Identification of the type's persistence

Persistent labor income reproduces the shape of a permanent type's profile.

- No type, i.i.d. growth factors, a permanent income level
- The profile stays **positive at every horizon**, as with a permanent type
- So a positive floor **no longer identifies a type**

3. Identification of the type's persistence

The wealth mobility profile, with persistent labor income and no type.



4. A fitted random growth model

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I fit the model to the 2022 U.S. top 10 wealth share.

- Vary the type's **persistence** and its **width**
- Labor income: estimated on the Panel Study of Income Dynamics (PSID)
- Keep the economies that match PSID wealth mobility **at ten years and in shape**

4. A fitted random growth model

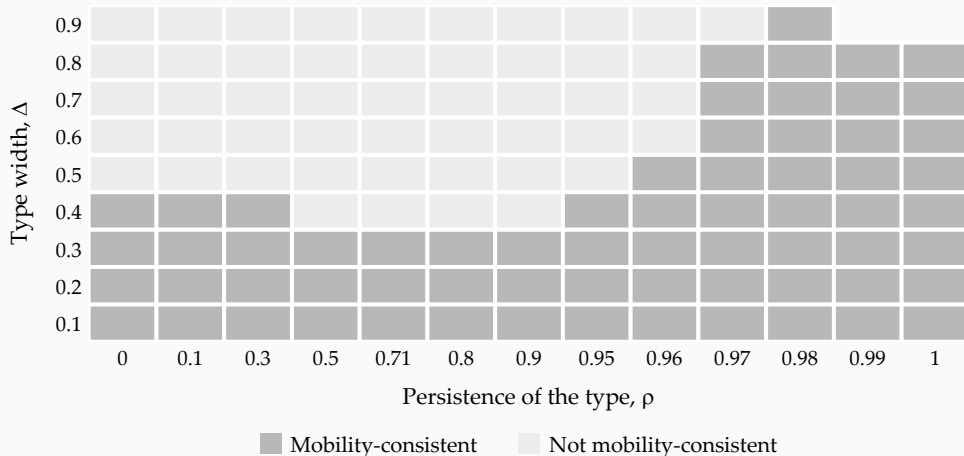
The share of type dependence is what the type's persistence adds.

With every channel off, the top 10 share falls from **0.74** to **0.135**. That fall splits into:

1. **Type dependence:** the fall from setting $\rho = 0$ alone
2. **Persistent labor income:** the fall from removing it alone
3. **Scale dependence:** the remainder

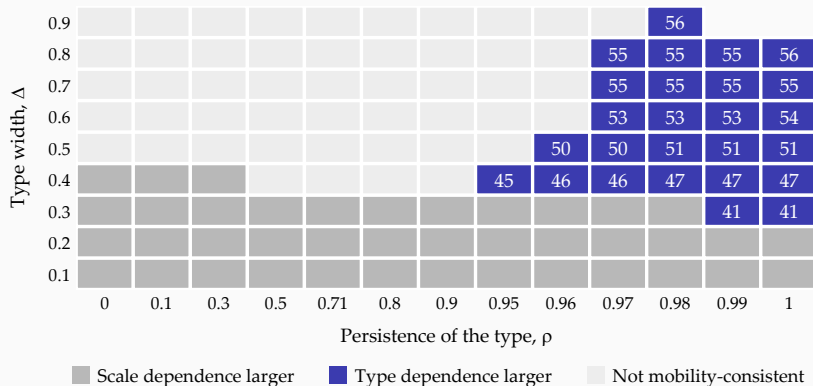
4. A fitted random growth model

The PSID's wealth mobility rules out a wide type unless it is nearly permanent.



4. A fitted random growth model

Scale dependence accounts for the larger share unless the type is very persistent and wide.



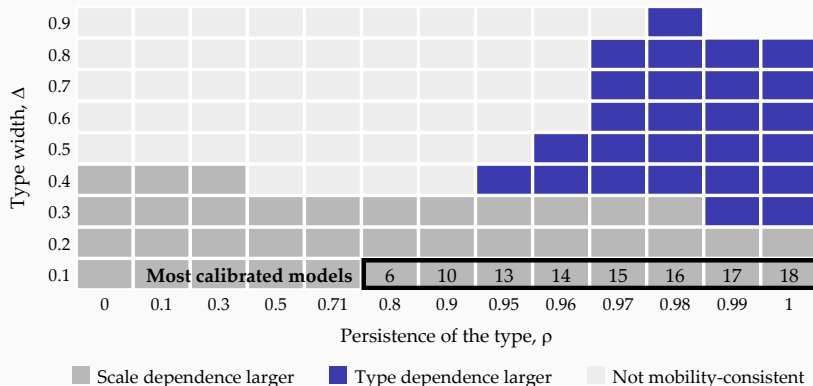
4. A fitted random growth model

Robustness: where type dependence leads, the economy misses the PSID.

- **Other shock dispersions:** wealth growth is more dispersed than in the PSID
- **Other labor income processes:** wrong wealth growth or wealth mobility

4. A fitted random growth model

Most calibrated models sit where type dependence is at most 18 percent.



5. Conclusion

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Calibrated models set the relative importance of type and scale dependence by choosing the type's persistence.

- Wealth inequality and one-period wealth mobility **cannot identify** that persistence
- Fitted model: type dependence leads only if the type is **very persistent and wide**
- At the types of most calibrated models, type dependence is **at most 18 percent**

Thank you.

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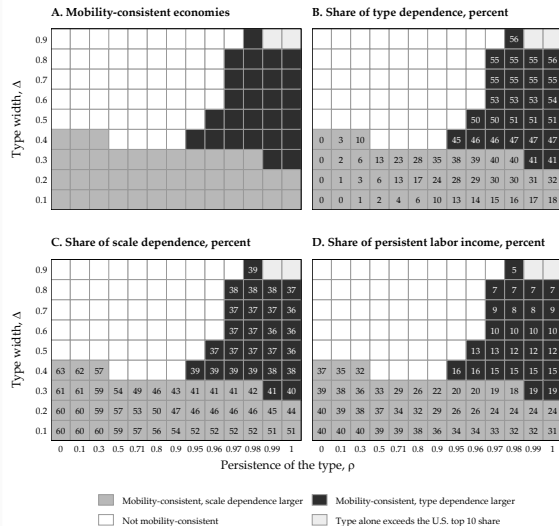
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Backup: Figure 1 of the paper



Backup: calibration

Parameter	Value	Target
Labor income: $\phi, \sigma_\xi, \sigma_z$	0.78, 0.18, 0.70	PSID income rank-rank coefficients, two to ten years
Labor income: σ_e	0.25	Güvenen (2009)
Shock dispersion $\bar{\sigma}$	0.65	PSID dispersion of wealth growth, 0.94
Type's average $\bar{\theta}$	0.58	top 10 wealth share, wealth mobility
Wealth gradient's slope d	per economy	top 10 wealth share 0.74, 2022 SCF
The type's persistence ρ	0 to 1	varied
The type's width Δ	0.1 to 0.9	varied

- An economy $\mathcal{E}(\rho, \Delta)$: three types $\bar{\theta} - \Delta/2, \bar{\theta}, \bar{\theta} + \Delta/2$ with equal probability. 118 economies: thirteen persistences by nine type widths, plus one without a type
- Mobility-consistent: ten-year wealth rank-rank coefficient in $[0.662, 0.723]$, and a Wald test of the profile's shape, $r_k - r_2$ at four to ten years

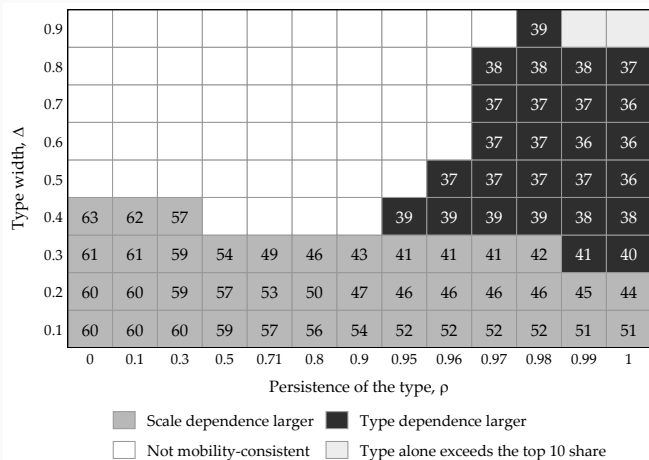
Model period two years. Labor income standard deviations annual. SCF: Board of Governors of the Federal Reserve System (2023).

Backup: robustness

- **A shock dispersion of 0.55**, near the smallest the PSID's growth-factor covariances allow: type dependence accounts for at most 41 percent
- **0.75 and 0.85**: type dependence leads in more economies, at most 56 percent, but every mobility-consistent economy then has wealth growth that differs more across households than in the PSID
- **Guvenen (2009) labor income**, $\bar{\sigma}$ refit to 0.69: type dependence leads only at permanent types of width 0.5 or more and one type with $\rho = 0.99$, at most 49 percent, and none matches the PSID's wealth growth
- **Gaillard et al. (2024) and Gaillard and Wangner (2023) labor income**, without a fixed effect: wealth ranks move too fast. The ten-year wealth rank-rank coefficient is at most 0.54 and no economy is mobility-consistent

Backup: the share of scale dependence

Share of scale dependence, percent, in each mobility-consistent economy.



Backup: the shock dispersion and a Shapley decomposition

The shock dispersion.

- In the PSID, the log of a household's wealth growth over two years, leaving out new saving, has a standard deviation of 0.94
- Reporting error and the rising wealth gradient also spread measured wealth growth. With both included, $\bar{\sigma} = 0.65$ gives the economy without a type the PSID's 0.94

A Shapley decomposition.

- Counting the type's dispersion as type dependence too moves the share of type dependence by up to 11 points across the mobility-consistent economies
- Type dependence then leads in fewer economies: no longer at a type width of 0.3, nor at a type width of 0.4 with a persistence below 0.97

Backup: the persistent types of calibrated models

Model	Type	ρ	Δ
<i>A. Impermanent types</i>			
Krusell and Smith (1998)	discount factor	0.96	0.02
Krusell et al. (2009)	discount factor	0.96	0.02
Cao and Luo (2017)	return	0.82	0.07
Bachmann et al. (2020)	discount factor	0.96	0.01
Hubmer, Krusell and Smith (2021)	discount factor	0.98	0.02
Atkeson and Irie (2022)	wealth growth	0.87	0.10
Guvenen et al. (2023)	return	0.94	at most 0.12
Song (2025)	return	0.92	0.03
Kaymak, Leung and Poschke (2026)	return	0.96	0.09
<i>B. Types permanent over a life</i>			
Erosa and Koreshkova (2007)	discount factor	1	0.02
Hendricks (2007)	discount factor	1	0.06 to 0.12
Benhabib, Bisin and Zhu (2011)	return	1	0.06 to 0.09
Carroll, Slacalek and Tokuoka (2014)	discount factor	1	0.02
Suen (2014)	discount factor	1	0.02

Persistence per two-year period and type width, as in the paper's Table 2, whose references and notes give each source. A range spans the interpretations of the source, and "at most" an upper bound.

Backup: the persistent types of calibrated models, continued

Model	Type	ρ	Δ
<i>B. Types permanent over a life, continued</i>			
Brinca et al. (2016)	discount factor	1	0.06
Krueger, Mitman and Perri (2016)	discount factor	1	0.04
Carroll et al. (2017)	discount factor	1	0.04 to 0.12
Benhabib, Bisin and Luo (2019)	return	1	0.08
Brinca et al. (2021)	discount factor	1	0.06
Xavier (2021)	return	1	0.03
Benhabib, Bisin and Fernholz (2022)	wealth growth	1	at most 0.03
Ernst et al. (2024)	discount factor	1	0.03
Gomez and Gouin-Bonenfant (2024)	discount factor	1	0.01
Mahler and Yum (2024)	discount factor	1	0.03
De Nardi, Pashchenko and Porapakkarm (2025)	discount factor	1	0.14
Albers, Kersting and Stieglitz (2026)	return	1	0.03 to 0.05
Catherine, Lu and Paron (2026)	discount factor	1	0.04
Hubmer et al. (2026)	return	1	0.14
Hubmer et al. (2026)	discount factor	1	0.32

Persistence per two-year period and type width, as in the paper's Table 2, whose references and notes give each source. A range spans the interpretations of the source, and "at most" an upper bound.