

Between Communities and Within Them

A Five-Census Decomposition of Intergenerational
Persistence in Bolivia, 1976–2024

Werner L. Hernani-Limarino

2026

The Puzzle

Bolivia's educational transformation:

- Mean maternal education: 1.7 $\rightarrow$ 9.6 years
- Mothers with zero education: 69% $\rightarrow$ 2%
- Secondary completion: <20% $\rightarrow$ >90%

Yet: Bolivia remains among Latin America's **least mobile** societies (Andersen 2001; Neidhöfer et al. 2018)

This paper: resolves the puzzle—and shows it is **deeper than it appears**

	1976	2024
% urban	42	70
Mother educ	1.7	9.6
Internet	—	76%
$\bar{\beta}$ national	0.67	0.39

National $\bar{\beta}$ fell 42%

But what drove the decline?

What This Paper Does

1. **Decomposition** (primary contribution — descriptive, robust):

- Five censuses: 1976, 1992, 2001, 2012, 2024
- Separate national persistence into **between-community** and **within-community** components using local rankings
- Finding: the *entire* 42% decline is between-community convergence

2. **Mechanisms** (suggestive evidence from the 1990s reforms):

- Fiscal decentralization (LPP) vs. privatization (Capitalización)
- DID: within-persistence spiked only in urban strata, only at *p75*
- Public goods don't harden hierarchies; private rents do

Conceptual Framework: Two Channels

Local transmission at rank x in community s :

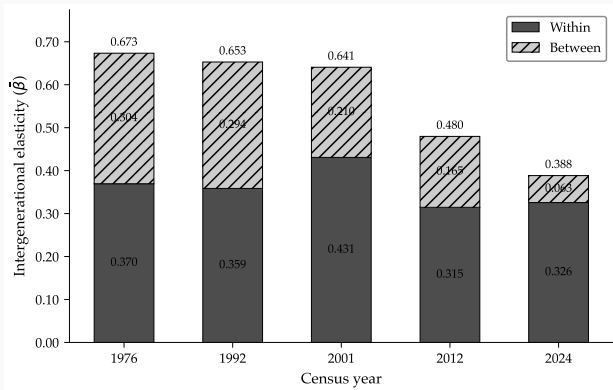
$$\beta_s(x) = \underbrace{\theta_s(x)}_{\text{credential share}} \cdot \underbrace{\beta^P}_{\text{low}} + (1 - \theta_s(x)) \cdot \underbrace{\beta^M}_{\text{high}}$$

- **Credential sector** (β^P): teachers, health workers, public admin — entry by qualification, **low heritability**
- **Network sector** (β^M): management, contracts, brokerage — entry by connections, **high heritability**
- $\theta_s(x)$ **decreasing in x** : networks dominate at the top

Predictions:

1. Infrastructure $\rightarrow \downarrow$ between (reduces $\text{Var}(\alpha_s)$), no effect on within
2. Privatization $\rightarrow \uparrow$ within at $p75$ in urban strata ($\downarrow \theta$ at top)
3. Fiscal transfers $\rightarrow$ no effect on β_s (change α_s , not θ_s)

Result 1: The Entire Decline Was Between-Community



Between:

0.304 $\rightarrow$ 0.063

—80%

Within:

0.370 $\rightarrow$ 0.326

Essentially flat

By 2024:

84% of national persistence
is within-community

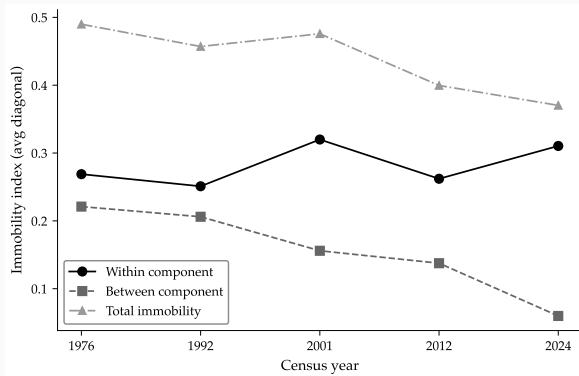
Bolivia connected its communities.
It did not change what happens
inside them.

Two Decompositions, One Conclusion

Year	Simple			Exact (variance-ratio)		
	Within	Between	%W	Within	Between	%W
1976	0.370	0.304	55	0.164	0.488	24
1992	0.359	0.294	55	0.194	0.418	30
2001	0.431	0.210	67	0.231	0.379	36
2012	0.315	0.165	66	0.190	0.259	40
2024	0.326	0.063	84	0.249	0.108	64

- **Simple:** “Did local inheritance intensity change?” → No (−12%)
- **Exact:** “What share of national variance is within-stratum?” → Rising (24%→64%)
- Both: between collapsed, within is increasingly all that is left
- Both: 2001 spike → motivates Section II

Specification-Free Confirmation: Transition Matrices



No functional-form assumption

Within immobility:

stable at 0.25–0.32

with 2001 spike

Between immobility:

monotonic decline

0.22 $\rightarrow$ 0.06

Two completely different methods,
same answer

Five Censuses, Five Bolivias

Census	Period	$\bar{\beta}_W$	$\bar{\beta}_B$
1976	Military rule. 69% mothers zero education. Communities isolated.	0.370	0.304
1992	Democracy + structural adjustment. Tin collapse. Spatial structure unchanged.	0.359	0.294
2001	Reform decade: LPP + Capitalización + Educational Reform	0.431	0.210
2012	MAS decade. Commodity boom. Gini –10 pts.	0.315	0.165
2024	70% urban, internet 76%, mean maternal educ 9.6 yrs	0.326	0.063

16 years of dictatorship + democracy + structural adjustment (1976–1992): **nothing moved**

The 1994 reforms: between started falling, within **spiked**

The Twin 1994 Reforms

Law of Popular Participation

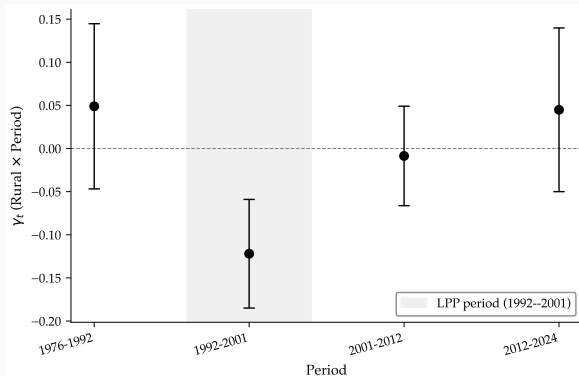
- 20% of revenue → 311 municipalities
- Cities: 86% → 27% of funds
- Funded: schools, health posts, roads
- Non-excludable goods
- Changes α_s , not θ_s

Capitalización

- Privatized YPFB, ENTEL, ENDE, LAB, ENFE
- Created: management, consulting, finance positions
- Concentrated in 9 dept. capitals
- Excludable rents
- Changes $\theta_s(p75)$ in urban strata

Prediction: Within-persistence $\uparrow$ in urban strata (Capitalización),
not in rural (LPP), concentrated at $p75$

Result 2: The 2001 Spike Was Urban-Only



Event study:

Rural $\times$ (1992–2001):

$$\gamma = -0.122$$

$$p_{\text{boot}} = 0.008$$

Pre-trend:

$$+0.049, p = 0.33$$

Flat

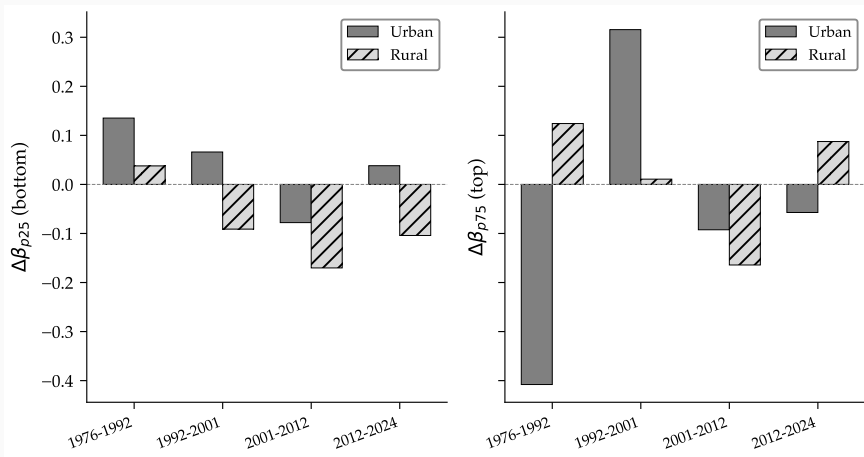
All other periods:

$$p > 0.30$$

Insignificant

Inference: HC2 + wild bootstrap
(9 clusters) + randomization

Result 3: Concentrated at $p75$, Zero at $p25$



Poverty trap ($p25$)

$$\gamma = -0.040, p_{RI} = 0.72$$

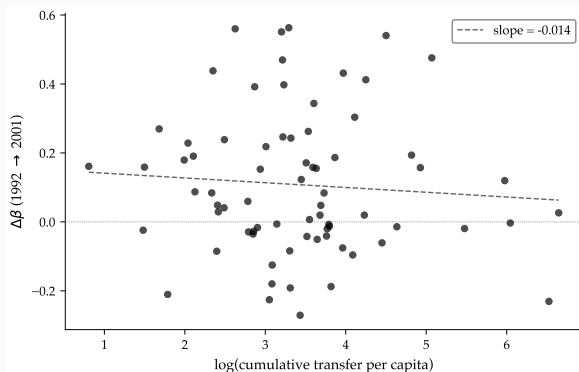
Dead zero

Privilege trap ($p75$)

$$\gamma = -0.427, p_{RI} = 0.002$$

Massive spike

Result 4: Fiscal Transfers Did Not Cause It



LPP formula allocation:
per capita, quasi-exogenous

Slope = -0.014

$t = -0.35$

Total null

Provinces that got more
LPP money did not see
larger persistence changes

The LPP is exonerated.

The Capitalización is implicated.

- **Age restriction** (25–29): $\bar{\beta}_W(2012)$ rises $0.315 \rightarrow 0.379$, series becomes *flatter*
- **Manski bounds**: 2024 $\bar{\beta} \in [0.343, 0.461]$ — tight
- **Three specifications**: education, SES composite, assets — all show decline
- **Transition matrices**: specification-free, same decomposition pattern
- **Province-level**: null results, consistent but imprecise ($N = 18\text{--}42$)
- **Lifecycle correction**: Nybom-Stachurski corrected $\bar{\beta}_W$: 0.345–0.460

Timing caveat: children of universally-educated mothers won't enter the 20–24 sample until ~ 2036 . Within-persistence *may* decline then. Current finding: five decades of expansion have not yet reduced it.

What Does This Mean?

1. **National mobility statistics are misleading** in countries with large spatial inequality. Bolivia's $\bar{\beta} = 0.39$ looks “moderate.” It is the average of a dissolved between-penalty and unchanged within-inheritance.
2. **Infrastructure closes the between-layer.** Roads, schools, fiscal transfers: -80% in 50 years. This worked.
3. **Infrastructure cannot close the within-layer.** Education equalized. Local hierarchies didn't move.
4. **The form of resource redistribution matters.** Public goods $\neq$ private rents. Same government, same decade, opposite effects.
5. **Policy implication:** Expand θ_s — the credential-gated share of the opportunity set. Merit-based hiring, transparent procurement, competition policy.

Bolivia connected its communities.
It did not change the rules within any of them.

wernerhl@gmail.com