

Mi Otro Género

What if you had been born on the other side?

Using opposite-sex twins to measure the cost of gender

Werner L. Hernani-Limarino · Alejandra Villegas Gutierrez

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The Question

How much does it **cost** a person
to be born female in Bolivia?

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How much does it **cost** a person
to be born female in Bolivia?

And a second question, less often asked:

How much does it **cost** a man
to be born male?

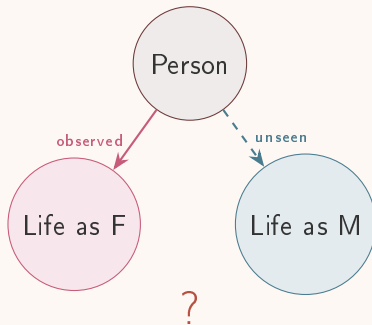
The Fundamental Problem

We can never observe the **same person** living two lives:

- one as a woman
- one as a man

This is the **fundamental problem of causal inference**: for each person, we see only one outcome.

So how do we measure what we can't see?



The Insight

Nature provides an approximation:

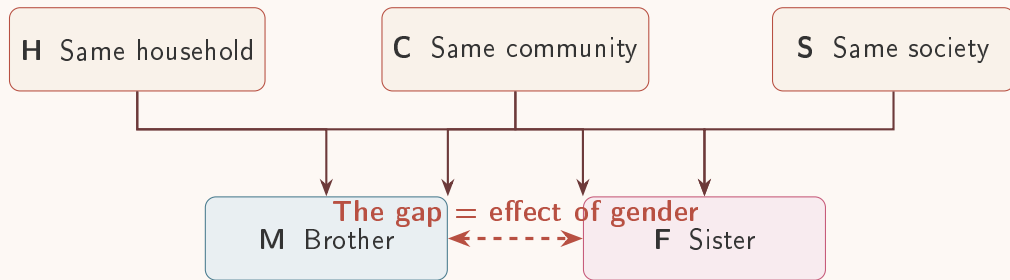
Opposite-sex fraternal twins

Same parents. Same home. Same neighborhood.

Same genes (50%). Same moment of birth.

Different sex → different treatment → different lives.

Why Twins Work



Everything is shared except one variable: **the sex assigned at birth.**

The Environment Has Layers

Gender norms operate through **three channels**:

H

Household

Parents pull the daughter out of school to help at the market.

C

Community

Neighbors mock the son who cooks. Peers gossip about the “ambitious” girl.

S

Society

The labor market pays women less. Schools channel girls to “female” fields.

Twins share all three layers. The difference captures the **total effect** of the system.

The Counterfactual — Formally

For each person i with sex g_i , define two **potential outcomes**:

$$Y_i(1) = \text{outcome if male} \quad Y_i(0) = \text{outcome if female}$$

The **causal effect of gender**:

$$\tau_i = Y_i(1) - Y_i(0)$$

We never observe both. But within a twin pair p :

$$d_p = Y_p^M - Y_p^F \approx \tau_p$$

Because sex determination in fraternal twins is **biologically random** within the pair.

The Intuition: A Kitchen Table Experiment

Imagine sitting at the kitchen table with Saturnina and Saturnino—twins, age 38.

Saturnino (brother)

- Finished high school
- Union leader, Bs 5,200/month
- 1.5 hours/day housework
- Decides family budget
- Has never been hit by a partner

Saturnina (sister)

- Left school at 14
- Sells cheese at the fair, Bs 1,800
- 6.5 hours/day housework
- Husband decides budget
- Has been hit “when he drinks”

Same parents. Same house. Same childhood.

The only systematic difference is their sex.

What the Difference Means

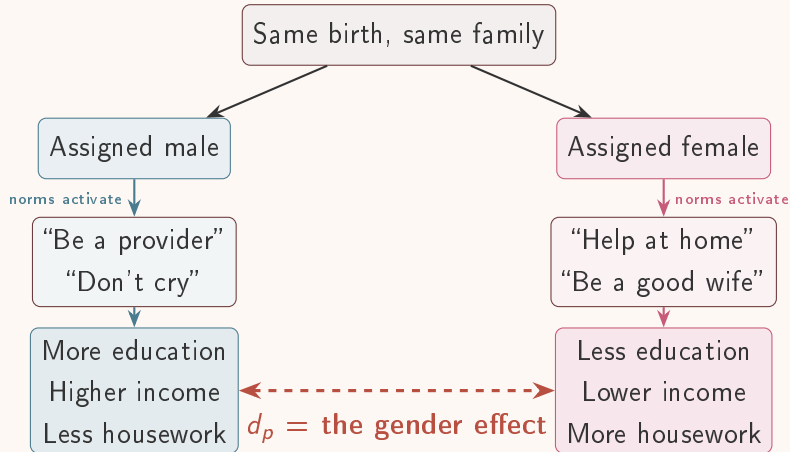
The gap between Saturnino and Saturnina is **not** explained by:

- × Different family wealth
(same parents, same house)
- × Different neighborhoods
(grew up next door to each other)
- × Different genes
(50% shared; sex is random)
- × Different “culture”
(same community, same norms)
- × Different innate ability
(she had *better* grades)
- × Different motivation
(she wanted to be a nurse)

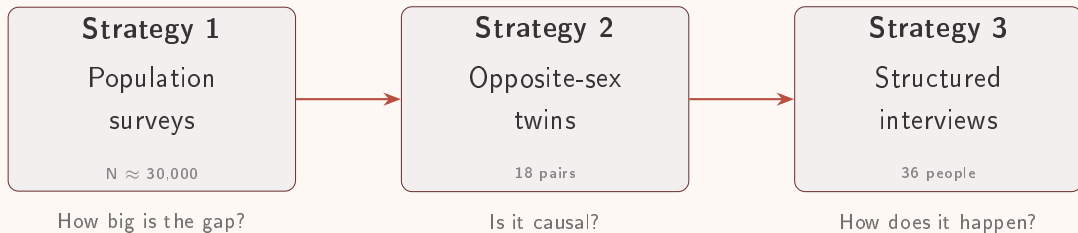
So what *is* it?

It is the **social machinery** that saw their sex and gave each of them a different script to follow.

The Logic in One Picture



Three Strategies, One Answer



When all three **converge**, the argument is credible.
When they **diverge**, we learn where assumptions break.

The Twin Sample

18 opposite-sex twin pairs across Bolivia:

Stratum	Pairs
Rural, low education	6
Urban informal	6
Urban professional	6

Age: 25–50 years

Recruitment: Civil registry + snowball

What we collect:

- Structured questionnaire
(same dimensions as national surveys)
- 7-day time diary
(30-minute blocks, both twins)
- In-depth interviews
(individual + joint session)

Six Dimensions of Inequality

○ **Time** — Who works for free?

H Household — Who decides?

★ **Education** — Who gets to study?

▷ **Violence** — Who is safe?

◇ **Labor** — Who gets paid?

≫ **Voice** — Who is heard?

Each dimension follows the same **5-step protocol**:

population estimate → twin estimate → mechanisms → penalty → bidirectional
counterfactual



Dimension 1: Time

Who works for free?

Time: The Invisible Shift

+4.7
hrs

more unpaid work per day
for the twin sister

-2.1 hrs

less leisure per day
for the twin sister

Brother

Rest + leisure: 12 hrs

Unpaid: 1.8 hrs

Paid: 10.2 hrs

Sister

Rest: 9.9 hrs

Unpaid: 6.5 hrs

Paid: 4.6 hrs

Time Use: The Numbers

Average daily hours by activity and sex — within twin pairs

Activity	Brother	Sister	Gap
Paid work	10.2	4.6	−5.6 hrs
Unpaid domestic	0.9	4.2	+3.3 hrs
Unpaid care	0.9	2.3	+1.4 hrs
Total unpaid	1.8	6.5	+4.7 hrs
Total work	12.0	11.1	−0.9 hrs
Leisure + rest	12.0	9.9	−2.1 hrs
Sensitivity Γ^*			2.8

$\Gamma^* = 2.8$: a hidden confounder would need to nearly **triple** the odds to explain this gap



Dimension 2: Education

Who gets to study?

Education: The Early Fork

–2.1 yrs

fewer years of schooling
for the twin sister

Gap concentrated in **rural pairs**:

- Rural: –4.3 years
- Urban informal: –1.8 years
- Urban professional: –0.2 years

Why? From the interviews:

In **12 of 18** pairs, the sister left school earlier than her brother.

Top reasons (coded):

1. Parental decision: “help at home”
(9 pairs)
2. Early pregnancy (5 pairs)
3. Self-selection: “that’s not for girls”
(4 pairs)

Education: The Numbers

Education outcomes by sex — within twin pairs

Indicator	Brother	Sister	Gap
Years of schooling	11.8	9.7	−2.1 yrs
Completed secondary (%)	83	56	−27 p.p.
Any tertiary (%)	39	22	−17 p.p.
<i>By stratum:</i>			
Rural pairs	8.2	3.9	−4.3 yrs
Urban informal	12.0	10.2	−1.8 yrs
Urban professional	15.3	15.1	−0.2 yrs
Sensitivity Γ^*			2.1



Dimension 3: Labor Markets

Who gets paid?

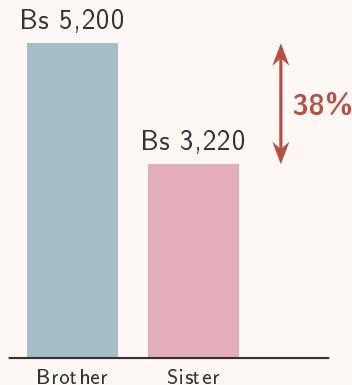
Labor: The Wage Gap Is Worse Than We Thought

38%

within-twin wage gap

vs. 27% from population matching

The population estimate
underestimates the true gap.
Between-family confounders were
masking the full effect of gender.



Oaxaca-Blinder: 60% of the gap is
“unexplained”

→ the norm operating on returns, not

Labor Markets: The Numbers

Labor outcomes by sex — within twin pairs

Indicator	Brother	Sister	Gap
Labor force participation (%)	100	72	−28 p.p.
Monthly income (Bs)	5,200	3,220	−38%
Formal employment (%)	44	17	−27 p.p.
Hours paid work / day	10.2	4.6	−5.6 hrs

Comparison with population estimate:

Population wage gap −27%

Twin wage gap −38%

Difference 11 p.p.

Sensitivity Γ^* (income)

2.5

H

Dimension 4: Household

Who decides?

Household: Asymmetric Bargaining

14 / 18

pairs where the brother has
greater decision-making authority

He decides about:

- Large purchases
- Where to live
- Children's schooling
- When to have children

She decides about:

- Daily food
- Children's clothing
- (often: nothing else)

“He decided when to marry.
She decided to say yes.”

Household Bargaining: The Numbers

Decision-making and assets — within twin pairs

Indicator	Brother	Sister	Gap
Decision-making index (0–1)	0.72	0.31	–0.41
Owns land or house (%)	61	22	–39 p.p.
Has own bank account (%)	56	28	–28 p.p.
Chose when to have children (%)	72	33	–39 p.p.

Who decides large purchases?

Husband / self	78%	11%	—
Wife / self	6%	22%	—
Joint	16%	67%	—

Sensitivity Γ^*

1.9



Dimension 5: Violence

Who is safe?

Violence: Not Explained by Poverty or Ignorance

11 / 18

twin sisters report
intimate partner violence

vs. 2 / 18 brothers

The twin design reveals:

Violence is not explained by:

- × Lower education (same family)
- × Poverty (same starting point)
- × “Culture” (same community)

It *is* predicted by:

- ✓ Lower bargaining power
- ✓ Economic dependence
- ✓ Norm enforcement

Violence: The Numbers

Violence and safety — within twin pairs

Indicator	Brother	Sister	Gap
Any intimate partner violence (%)	11	61	+50 p.p.
Physical violence (%)	6	39	+33 p.p.
Economic violence (%)	6	44	+38 p.p.
Feels safe walking alone at night (%)	72	22	−50 p.p.
<i>Population comparison (EDSA):</i>			
Population IPV prevalence		44%	—
Twin IPV prevalence		61%	—
Sensitivity Γ^*			2.3



Dimension 6: Voice

Who is heard?

Voice: The Leadership Gap

3.2×

more likely for the brother
to hold a leadership position

Brothers:

- Union leaders
- Neighborhood board members
- Cooperative presidents

Sisters:

- School parent committees
- Church groups
- Mostly: no formal participation

“I don’t have time. I have to cook.”

— Twin sister, rural pair

Voice and Participation: The Numbers

Civic participation and leadership — within twin pairs

Indicator	Brother	Sister	Gap
Member of any organization (%)	72	44	−28 p.p.
Holds leadership role (%)	44	11	−33 p.p.
Leadership ratio (M/F)	—		3.2×
Has spoken at a public meeting (%)	61	22	−39 p.p.
Voted in last election (%)	89	83	−6 p.p.
<i>Main barrier cited by sisters:</i>			
“No time” (domestic duties)	12 of 18 pairs		
“Husband wouldn’t approve”	5 of 18 pairs		

Summary: All Six Dimensions at a Glance

Within-twin gender gaps across dimensions ($P = 18$ pairs)

Dimension	Key indicator	Gap	Γ^*	Robustness
Time	Unpaid work (hrs/day)	+4.7	2.8	Very robust
Education	Years of schooling	-2.1	2.1	Robust
Labor	Wage gap (%)	-38	2.5	Robust
Household	Decision index (0-1)	-0.41	1.9	Robust
Violence	IPV prevalence (p.p.)	+50	2.3	Robust
Voice	Leadership ratio	3.2×	1.5	Moderate

Every dimension shows a gender gap favoring the brother.

Five of six are robust to strong hidden confounding ($\Gamma^* \geq 1.9$).

This is not one gap. It is a system.

Why Norms Persist: The Penalty

Gender norms persist because **deviating is costly**:

◇ **Ridicule**: “That’s not for women”

× **Ostracism**: excluded from social circles

! **Conflict**: domestic arguments, family pressure

⊗ **Violence**: physical retaliation for “disobedience”

\$ **Economic**: harder to find a partner, lost support

In **15 of 18** pairs, at least one twin reports not doing something they wanted to do

How Confident Are We?

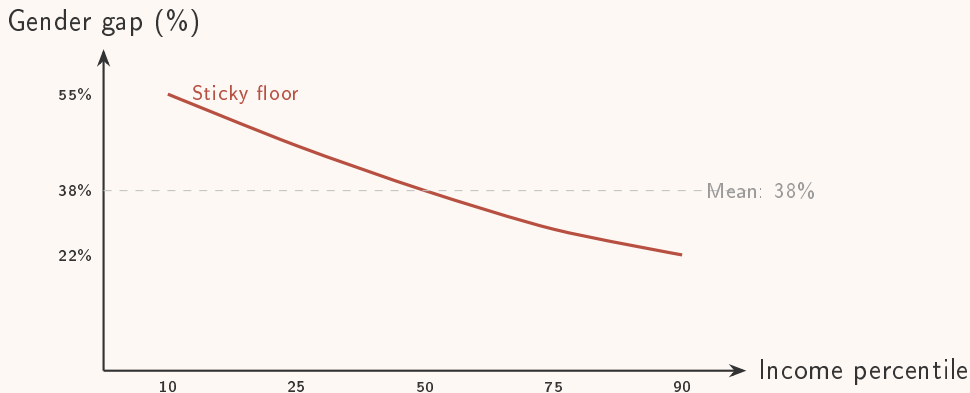
Rosenbaum sensitivity analysis: How strong would a hidden confounder need to be to explain away the gap?

Dimension	Gap	Γ^*
Unpaid work (hours/day)	+4.7 hrs	2.8 (very robust)
Education (years)	−2.1 yrs	2.1 (robust)
Wage gap (%)	38%	2.5 (robust)
Decision-making index	−0.41	1.9 (robust)
Violence prevalence	+50 p.p.	2.3 (robust)
Leadership positions	−3.2×	1.5 (moderate)

$\Gamma^* > 2$: an unobserved factor would need to **double the odds** to explain the gap.

Not a Flat Tax: The Gap Varies

The gender gap is **larger at the bottom** of the income distribution:



The poorest women pay the highest gender penalty

The Counterfactual Goes Both Ways

$F \rightarrow M$

If she had been born male:

- + 2.1 more years of education
- + 38% higher income
- + 4.7 fewer hours of unpaid work
- + Decision-making power
- + Physical safety

$M \rightarrow F$

If he had been born female:

- + Emotional freedom
- + Closer family bonds
- Loss of income, autonomy
- Loss of public voice
- Risk of violence

Gender inequality harms **everyone**—but not equally.

The total cost of gender in Bolivia:

7.8 — 11.1%
of GDP

\$3,900M — \$5,500M per year

Lost labor income + lost human capital + misallocated time

Not a Women's Issue

This is a **macroeconomic inefficiency** of the first order.

Comparison	% of GDP
Cost of gender inequality	7.8 – 11.1%
Natural gas revenue (peak year)	6.2%
Public education spending	7.3%
Total fiscal deficit (2023)	8.5%

Bolivia loses more to gender norms than it earned from natural gas at its peak.

What We Learned

1. Gender inequality in Bolivia is **not a residue of the past**. It is an **active machine** that operates every day.
2. The machine runs on **social norms** enforced through families, communities, and markets simultaneously.
3. The norms persist because **deviation is punished**—not by law, but by gossip, ostracism, and violence.
4. The cost is **borne by everyone**—women pay more, but men lose emotional freedom and human connection.
5. The total cost is **enormous**: 8–11% of GDP. Solving it is not charity. It is smart economics.

“Neither of them considers
their situation unjust.
Both would say:
that’s just how things are.”

This book argues that
“**how things are**”
is precisely the problem.