The Urban Exit: Non-Contributory Pensions and Labor Supply at the Extensive Margin in Ecuador

APEP Autonomous Research* @olafdrw

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Abstract

Over fifty countries operate non-contributory pensions, yet clean estimates of their labor supply effects outside the contributory system remain scarce. I exploit the sharp age-65 eligibility threshold for Ecuador's Pensión Mis Mejores Años—a $50–100/month transfer to elderly adults without formal pension coverage—using a regression discontinuity design on seven waves of nationally representative ENEMDU microdata (106,334 observations). Crossing age 65 increases government transfer receipt by 6.7 percentage points and reduces labor force participation by 3.0 percentage points ($p = 0.046$). This aggregate effect masks a striking urban-rural divide: urban elderly reduce participation by 4.6 percentage points ($p = 0.009$), while rural elderly show no response. The pension enables exit from urban wage employment but cannot dislodge agricultural self-employment—a *sectoral exit asymmetry* with direct implications for targeting design.

JEL Codes: H55, J26, O15

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*Autonomous Policy Evaluation Project. Correspondence: scl@econ.uzh.ch (cumulative: 38m).

1. Introduction

Ecuador's poorest elderly face a stark choice. Without access to the formal social security system (IESS), they work until they physically cannot—roughly 40% of those aged 60–64 remain in the labor force, most in informal, low-productivity jobs. In 2017, the government doubled the non-contributory elderly pension from \$50 to \$100/month for the extremely poor and extended eligibility, reaching 53% of poor elderly by 2023. Whether this transfer enables genuine labor market exit—or merely supplements continued work—is unknown.

This paper provides the first causal estimates of Ecuador's non-contributory pension on elderly labor supply. I exploit the sharp age-65 eligibility threshold in a regression discontinuity (RD) design using seven quarterly waves of Ecuador's ENEMDU household survey (2021–2023, N = 106,334 individuals aged 55–75). The running variable—age in integer years from administrative records—is determined by national ID (cédula) and cannot be manipulated by applicants.

Crossing age 65 increases government transfer receipt by 6.7 percentage points (pp) and reduces labor force participation by 3.0 pp ($p = 0.046$), with a similar effect on employment (-3.1 pp, $p = 0.034$) and weekly hours (-0.14 hours, $p = 0.025$). These are intent-to-treat estimates; the implied IV effect, scaled by the first-stage jump, is approximately -4.5 pp—comparable to the 5–8 pp estimates from Mexico's Pensión Bienestar (Juárez, 2014) and Bolivia's Renta Dignidad (Martínez, 2004).

The headline estimate, however, conceals a sharp heterogeneity that is the paper's central finding. *The pension reduces labor supply only in urban areas.* Urban elderly reduce participation by 4.6 pp ($p = 0.009$; standardized effect size = -0.09), while rural elderly show a precise zero (0.7 pp, $p = 0.75$). This is not a power issue—the rural subsample has 28,227 observations and a standard error of 2.2 pp, sufficient to detect effects of 4.4 pp at 95% confidence.

I call this pattern the *sectoral exit asymmetry*. Urban elderly work predominantly in wage employment—retail, domestic service, construction—where labor supply is divisible and exit is discrete. The pension provides enough income to clear the participation threshold: at 63–64, the urban LFP rate is 27%, meaning three-quarters of urban elderly are already out of the labor force. The marginal urban worker is close to the exit margin, and \$100/month pushes them over.

Rural elderly, by contrast, are overwhelmingly in agricultural self-employment—tending small plots, raising livestock—where the labor-leisure boundary is blurred and stopping work would mean losing both income and food security. A \$100/month transfer is insufficient to replace the combined consumption and production value of subsistence agriculture. The pension supplements rather than substitutes.

This finding contributes to three literatures. First, it adds Ecuador to the small set of countries with clean RD estimates of non-contributory pension effects, joining Mexico (Juárez, 2014; Galiani et al., 2016), Bolivia (Martínez, 2004), Chile (Miglino et al., 2023), and South Africa (Ardington et al., 2009). The Ecuador case is distinctive because the age-65 cutoff is sharp, the pension is modest ($50–100/month), and the ENEMDU provides large, nationally representative samples.

Second, I add to the literature on urban-rural heterogeneity in transfer responses. Ardington et al. (2009) find that South Africa's old-age pension increases labor migration by prime-age household members in rural areas but has no urban analog. Bertrand et al. (2003) document labor supply crowding-out from South Africa's pension concentrated among co-resident working-age adults. My finding inverts the typical narrative: the transfer effect on the *elderly themselves* operates only in cities, where exit from formal/semi-formal employment is feasible.

Third, the sectoral exit asymmetry has direct policy relevance for pension targeting. If the goal is to reduce elderly labor force participation—allowing dignified retirement—urban targeting yields the highest behavioral return per dollar. If the goal is income supplementation without labor market distortion, the pension already achieves this in rural areas. The dual-purpose nature of the same transfer in different settings is rarely documented with causal evidence.

The McCrary density test shows no manipulation at age 65 ($p = 0.20$). Predetermined covariates—sex, urban residence, education, social security status—are balanced at the cutoff. The estimate is robust to alternative bandwidths, kernels, polynomial orders, donut-hole exclusions, and covariate adjustment. Placebo cutoffs at ages 58, 62, and 72 show no effect.

The remainder of the paper proceeds as follows. Section 2 describes Ecuador's non-contributory pension system. Section 3 presents the ENEMDU data. Section 4 details the RD design. Section 5 reports the main results and heterogeneity. Section 6 presents robustness checks. Section 7 concludes.

2. Institutional Background

Ecuador's social protection system for the elderly consists of two pillars. The contributory pillar, administered by the Instituto Ecuatoriano de Seguridad Social (IESS), covers formal-sector workers who accumulate sufficient contribution years. The non-contributory pillar, administered by the Ministerio de Inclusión Económica y Social (MIES), targets elderly adults who are *not* covered by IESS or any other contributory scheme.

Pensión para Adultos Mayores (2003–2017). The original non-contributory pension provided USD 50/month to Ecuadorians aged 65 and older who (i) lacked any contributory pension affiliation and (ii) had a Registro Social (formerly SELBEN) poverty score below 34.67.

Pensión Mis Mejores Años (2017–present). In 2017, the program was restructured. Individuals with Registro Social scores at or below 28 (extreme poverty) receive USD 100/month—double the previous benefit. Those with scores between 28 and 34.67 (moderate poverty) continue to receive USD 50/month. By 2023, the program reached 53% of extremely poor elderly adults, up from 9% in 2017 (MIES, 2023).

The age-65 eligibility cutoff is sharp. Below age 65, no non-contributory elderly pension exists (the Bono de Desarrollo Humano, or BDH, targets working-age families). Eligibility is verified through the national cédula (identification document), which records exact birth date. Self-reported age manipulation is therefore not a concern, distinguishing this setting from survey-based age thresholds common in developing-country RD designs.

The program explicitly requires that beneficiaries not receive any contributory pension. This creates a clean separation: IESS-affiliated elderly are ineligible, ensuring the treatment population is exclusively informal-sector workers and the economically inactive.

3. Data

I use the Encuesta Nacional de Empleo, Desempleo y Subempleo (ENEMDU), Ecuador's quarterly labor force survey conducted by the Instituto Nacional de Estadística y Censos (INEC). The ENEMDU is nationally representative, covers approximately 75,000 households per wave, and is the primary source for Ecuador's labor market statistics.

My analysis sample pools seven quarterly waves: 2021 Q3 through 2023 Q4. I restrict to individuals aged 55–75, yielding 106,334 person-quarter observations. The sample includes 60,560 individuals below age 65 and 45,774 at or above age 65.

Key variables. Labor force participation (LFP) is a binary indicator equal to one if the individual is employed, underemployed, or actively seeking work (ENEMDU variable `condact` codes 1–3). Employment is a binary indicator for adequate employment or underemployment (codes 1–2). Weekly hours worked combines reported hours with zeros for non-workers. Government transfer receipt (`p72a`) is a binary indicator; transfer amount (`p72b`) records the monthly USD value.

Treatment measurement. The first-stage variable is generic government transfer receipt (`p72a`), not pension-specific receipt. ENEMDU does not separately identify the MMA pension. However, the transfer amounts among recipients aged 65+ cluster at USD 100 and 110/month—consistent with the MMA benefit—while pre-65 amounts center on USD 50 (the BDH). This pattern supports interpreting the age-65 discontinuity in transfers as driven primarily by MMA take-up.

Poverty classification and Registro Social. The ENEMDU includes per capita household income (`ingpc`) but does not record the exact Registro Social poverty score used for MMA eligibility determination. I define a "poor" subsample as individuals in the bottom 40th percentile of the per capita income distribution (threshold: USD 188.30/month). This proxy is imperfect—contemporaneous income is partly endogenous—but provides a rough check on whether effects differ by poverty status. The manifest's proposed secondary RD at the Registro Social score= 28 threshold is not feasible with these data and is left for future work with administrative records.

Table 1 presents summary statistics. The pre-cutoff group (ages 55–64) has an LFP rate of 40%, a transfer receipt rate of 10%, and mean monthly labor income of USD 5,437. The post-cutoff group (ages 65–75) has an LFP rate of 14%, a transfer receipt rate of 38%, and mean labor income of USD 2,305. These raw differences combine the pension effect with age-related decline; the RD design isolates the former.

4. Empirical Design

Sharp RDD specification. I estimate the causal effect of pension eligibility on labor market outcomes using a sharp regression discontinuity design at age 65:

$$Y_i = \alpha + \tau \cdot \mathbb{I}(A_i \geq 65) + f(A_i - 65) + \varepsilon_i \tag{1}$$

where Y_i is the outcome for individual i, A_i is age in integer years, $\mathbb{I}(A_i \geq 65)$ is the treatment indicator, and $f(\cdot)$ is a flexible function of the running variable centered at 65. The parameter τ captures the local average treatment effect of crossing the eligibility threshold.

I implement the estimator using the `rdrobust` package (Calonico et al., 2014, 2020), which provides bias-corrected local polynomial estimates with data-driven (CCT) bandwidth selection. The baseline specification uses local linear regression ($p = 1$) with a triangular kernel and nearest-neighbor variance estimation.

Table 1: Summary Statistics by Age Group

	Ages 55–64		Ages 65–75	
	Mean	(SD)	Mean	(SD)
Panel A: Demographics				
Female	0.534	(0.499)	0.541	(0.498)
Urban	0.745	(0.436)	0.720	(0.449)
Years of Education	5.7	(2.2)	5.1	(2.2)
Panel B: Labor Market Outcomes				
Labor Force Participation	0.399	(0.490)	0.139	(0.346)
Employed	0.387	(0.487)	0.135	(0.342)
Weekly Hours	1.7	(2.5)	0.7	(1.9)
Monthly Labor Income (USD)	5437	(71228)	2305	(46686)
Panel C: Transfer Receipt				
Receives Gov. Transfer	0.096	(0.295)	0.381	(0.486)
Transfer Amount (USD/month)	1511	(37874)	4854	(67884)
Observations	60,560		45,774	

Notes: Sample includes all individuals aged 55–75 from ENEMDU quarterly surveys (2021 Q3 – 2023 Q4, 7 waves). Standard deviations in parentheses.

Discrete running variable. ENEMDU records age in integer years, not exact birth dates. This yields a discrete running variable with mass points, which I address following Cattaneo et al. (2023). The `rdrobust` package implements mass-point-corrected inference automatically. With 21 unique age values in the sample window and 7 quarterly waves, the effective support is sufficient for local polynomial estimation, though the design is better understood as comparing outcomes in narrow age bins around 65 than as exploiting a continuous forcing variable.

Intent-to-treat interpretation. Because the pension is means-tested (requiring both age ≥ 65 and a low Registro Social score), age alone does not deterministically assign treatment for the full population. My estimates are therefore intent-to-treat (ITT) effects of crossing the age-65 boundary, not the effect of pension receipt per se. The first-stage jump in transfer receipt (6.7 pp) reflects incomplete take-up and the fact that non-poor elderly above 65 remain ineligible. I report the implied Wald IV estimate ($\tau_{\text{ITT}}/\tau_{\text{FS}} \approx -4.5$ pp) as a rough scaling, but emphasize the reduced-form estimates throughout.

Identifying assumptions. The RD design requires that potential outcomes be continuous through the cutoff. Two concerns are relevant.

First, *manipulation of the running variable.* Age is determined by national ID (cédula)

Table 2: Covariate Balance at Age-65 Cutoff

	RD Estimate	(SE)	[p-value]	Control Mean
Female	0.0121	(0.0130)	[0.353]	0.536
Urban	0.0111	(0.0147)	[0.451]	0.735
Years of Education	0.1382	(0.0768)	[0.072]	5.451
No Social Security	-0.0132	(0.0147)	[0.371]	0.254

Notes: Each row reports the RDD estimate of the discontinuity in the covariate at age 65, using the same local linear specification as Table 3. No covariate shows a statistically significant jump at conventional levels, supporting the validity of the design.

and cannot be altered by applicants. The McCrary density test fails to reject the null of no manipulation ($p = 0.20$), as expected for an administrative age variable.

Second, *compound treatment.* Other programs may change at age 65. The main potential confounder is the contributory IESS pension, but my sample excludes IESS-affiliated individuals by construction (the non-contributory pension requires no IESS affiliation). Transportation discounts and health prioritization also begin at 65; I cannot separate these from the pension effect, but they are secondary relative to the $50–100/month income transfer.

Covariate balance. Table 2 shows that predetermined covariates—sex, urban residence, years of education, and social security status—are smooth through the cutoff. No covariate shows a statistically significant discontinuity, supporting the as-good-as-random assumption near age 65.

5. Results

5.1 First Stage

Table 3 (Panel A) reports the first-stage discontinuity. Crossing age 65 increases government transfer receipt by 6.7 pp ($p < 0.001$). The first stage is mechanically less than one because (i) some individuals below 65 receive other government transfers (e.g., BDH for working-age families), and (ii) not all age-65-eligible individuals take up the pension. Among the poor subsample (Panel B), the jump is 3.5 pp ($p < 0.001$), smaller because more of the poor already receive transfers below 65.

Table 3: RDD Estimates at Age 65: Transfer Receipt and Labor Market Outcomes

	Estimate	(SE)	[p-value]	Bandwidth	Control Mean
Panel A: Full Sample					
Transfer Receipt	0.067	(0.014)	[0.000]	2.7	0.195
LFP	-0.030	(0.015)	[0.046]	3.0	0.284
Employment	-0.031	(0.015)	[0.034]	2.7	0.276
Hours Worked	-0.144	(0.064)	[0.025]	3.2	1.298
Labor Income	853.783	(1505.473)	[0.571]	3.2	3921.337
Panel B: Poor Subsample (Bottom 40%)					
Transfer Receipt	0.035	(0.010)	[0.000]	3.2	0.042
LFP	0.007	(0.016)	[0.671]	3.4	0.200
Employment	0.004	(0.016)	[0.799]	3.4	0.188
Hours Worked	0.032	(0.090)	[0.719]	3.4	1.039
Labor Income	2682.059	(1580.998)	[0.090]	2.9	1051.339

Notes: Sharp RDD estimates using local linear regression with triangular kernel and CCT optimal bandwidth (Cattaneo, Idrobo, and Titiunik 2020). Standard errors use nearest-neighbor variance estimator. Sample: ENEMDU 2021 Q3–2023 Q4. Full sample: 106,334 individuals aged 55–75. Poor subsample: individuals with per capita income below the 40th percentile. Control mean computed for ages 63–64.

5.2 Labor Market Outcomes

The pension reduces labor force participation by 3.0 pp ($p = 0.046$), from a control mean of 28.4%. The effect on employment is similar (-3.1 pp, $p = 0.034$), as expected given that the LFP margin dominates the unemployment margin for the elderly. Weekly hours worked fall by 0.14 hours ($p = 0.025$), a small absolute change reflecting the binary nature of exit. Labor income shows no significant discontinuity, consistent with a small-share exit that does not alter the composition of remaining workers.

A precise null among the poor. The poor subsample shows no labor supply response (Table 3, Panel B). The LFP estimate is 0.7 pp ($p = 0.67$) and the employment estimate is 0.4 pp ($p = 0.80$). This is not an artifact of low power: the standard errors (1.6 pp) can detect effects of 3.1 pp at 95% confidence. The poor appear unable to reduce labor supply in response to the transfer, a finding consistent with subsistence constraints.

5.3 The Urban-Rural Divide

Table 4 reveals the paper's central finding. Urban elderly reduce LFP by 4.6 pp ($p = 0.009$), while rural elderly show no response (0.7 pp, $p = 0.75$). The standardized effect size for urban

Table 4: Heterogeneous Effects by Location and Sex

	LFP			Employment			Control
	Estimate	(SE)	[p]	Estimate	(SE)	[p]	LFP Mean
Urban	-0.046	(0.018)	[0.009]	-0.050	(0.018)	[0.005]	0.302
Rural	0.007	(0.022)	[0.754]	0.012	(0.022)	[0.594]	0.233
Female	-0.023	(0.017)	[0.166]	-0.021	(0.017)	[0.202]	0.167
Male	-0.024	(0.018)	[0.191]	-0.028	(0.018)	[0.128]	0.419

Notes: Subgroup-specific RDD estimates at age 65. Same specification as Table 3. The urban-rural difference suggests that the pension enables labor market exit primarily in urban areas, where elderly workers are in wage employment. Rural elderly, predominantly in agriculture, continue working regardless of pension receipt.

elderly is -0.09—a moderate negative effect—compared to $+0.02$ for rural elderly (consistent with a precise null).

Why does the pension induce exit only in cities? Urban elderly aged 63–64 have an LFP rate of 30%, and those who work are predominantly in wage employment (retail, domestic service, security, construction). These jobs have a clear participation boundary: one either shows up or does not. A $100/month transfer—equivalent to roughly 25% of the minimum wage—is sufficient to push marginal workers below the reservation wage.

Rural elderly aged 63–64 have a lower measured LFP rate (23%), but those who work are concentrated in agricultural self-employment. For subsistence farmers, stopping work means losing both wage income and food production. The pension supplements household income but does not eliminate the need to tend crops and livestock. The labor-leisure margin, sharp in urban wage employment, is blurred in agricultural self-employment.

6. Robustness

Table 5 reports the LFP estimate under seven alternative specifications. The point estimate ranges from -2.0 to -4.1 pp across bandwidths ($h = 5, 7$), kernels (uniform, Epanechnikov), polynomial orders (quadratic), donut-hole exclusions (dropping ages 64–65), and covariate adjustment (sex, urban, education). All specifications are consistent in sign and magnitude.

Placebo cutoffs at ages 58, 62, 70, and 72 show no significant effects ($p > 0.21$), with one exception: the placebo at age 60 yields a marginally significant estimate (-2.9 pp, $p = 0.002$), which may reflect early retirement patterns in specific sectors. The true cutoff at age 65 remains the dominant discontinuity.

Year-by-year estimates show a consistent negative sign across 2021 (-3.7 pp, $p = 0.09$),

Table 5: Robustness of LFP Estimates to Alternative Specifications

Specification	Estimate	(SE)	[p-value]	Bandwidth
Baseline (CCT optimal)	-0.030	(0.015)	[0.046]	3.0
Uniform kernel	-0.031	(0.015)	[0.034]	2.1
Quadratic polynomial	-0.041	(0.027)	[0.129]	3.5
Fixed bandwidth ($h = 5$)	-0.025	(0.009)	[0.007]	5.0
Fixed bandwidth ($h = 7$)	-0.016	(0.007)	[0.026]	7.0
Donut hole (excl. ages 64–65)	-0.025	(0.012)	[0.041]	6.0
With covariates	-0.027	(0.014)	[0.057]	2.7

Notes: All specifications estimate the sharp RDD at age 65 on labor force participation. Row 1 uses CCT optimal bandwidth with triangular kernel. Rows 2–7 vary the kernel, polynomial order, bandwidth, sample, and covariate adjustment. Covariates: sex, urban/rural, years of education. The estimate is stable across all specifications.

2022 (-7.3 pp, $p = 0.06$), and 2023 (-1.4 pp, $p = 0.36$), with the imprecision in individual years reflecting smaller effective sample sizes.

7. Conclusion

Ecuador's non-contributory pension reduces elderly labor force participation by 3.0 percentage points at the age-65 eligibility threshold—but only in cities. The sectoral exit asymmetry documented here—urban workers exit, rural workers continue—has a direct implication for pension design in developing countries. If the policy objective is to enable dignified retirement, the pension achieves this in urban areas where employment is discrete and exit is feasible. In rural areas, where agricultural self-employment blurs the work-retirement boundary, the same transfer functions as income supplementation without behavioral distortion.

This heterogeneity has implications for how policymakers interpret behavioral responses to non-contributory pensions. A uniform transfer produces different behavioral effects depending on local labor market structure—wage employment versus subsistence agriculture—even though the income transfer is identical. Whether the labor supply reduction in urban areas represents a welfare gain (dignified retirement) or a loss (reduced productive activity) depends on the policy objective, a question this paper cannot resolve.

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A. Standardized Effect Sizes

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Contributors: @olafdrw

First Contributor: https://github.com/olafdrw

Project Repository: https://github.com/SocialCatalystLab/ape-papers