Age-Labor Income Profile

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2026-02-19

Research Question

To what extent do labor income models capture the structural determinants of income, and how does the balance between their interpretability and predictive accuracy affect their usefulness for policymaking?

Is there empirical evidence of a non-linear (concave) relationship between age and labor income in Bogotá, and how does this relationship change when controlling for hours worked and type of employment?

Data

Table 1: *

Distribución de las variables numéricas

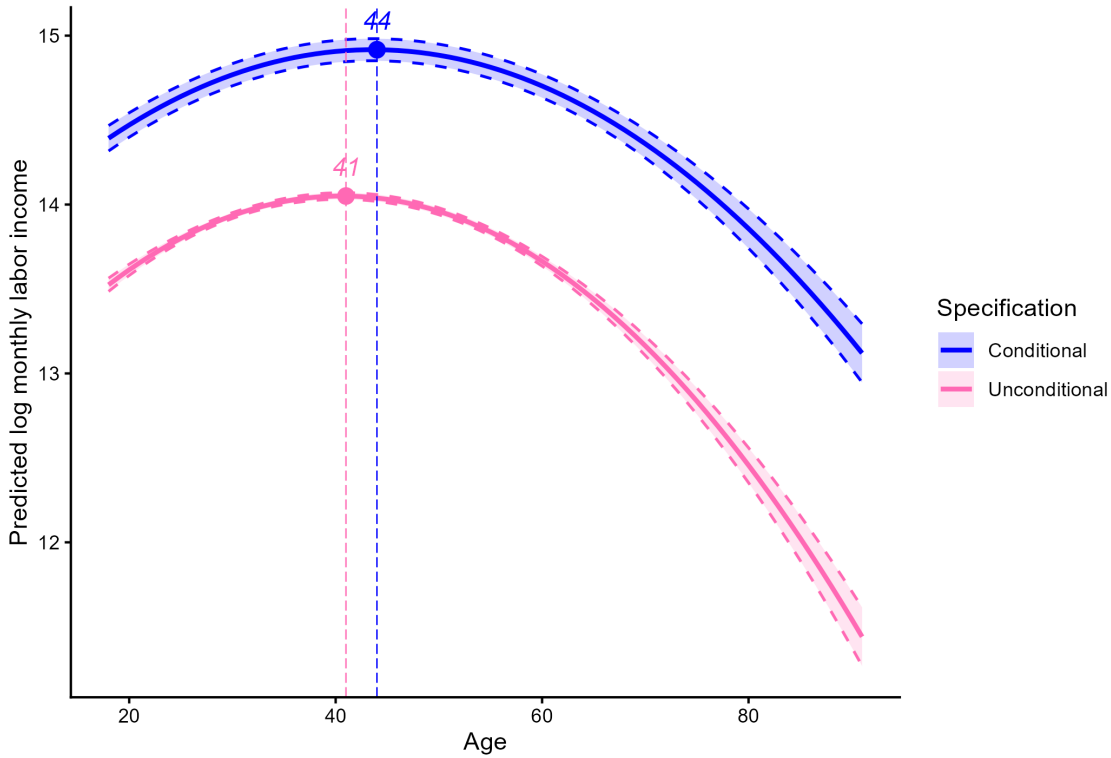
	Promedio	SD	Min	P10	Mediana	P90	Max
Ingresos laborales por hora	8.541.87	13.866.13	0.47	2.333.33	4.837.49	16.855.89	350.583.3
mes	6.5	3.36	1	2	6	11	12
total_hours	47.6	15.16	1	30	48	66	130
Edad	38.89	13.2	18	23	37	58	91
y_total_m	1.617.551	2.431.319	84	4e+05	992.744.7	3.033.333	7e+07
N. menores de edad en el hogar	0	0	0	0	0	0	0
N. adultos mayores inactivos en el hogar	0	0	0	0	0	0	0

Data

	N	%	Promedio	SD
Sexo				
Male	7,775	52.7%	8,876	14,765
Female	6,989	47.3%	8,170	12,782
Máximo nivel educativo				
Complete secondary	4,812	32.6%	5,123	4,599
Tertiary education	6,115	41.4%	13,958	19,810
Complete primary	1,346	9.1%	4,265	2,824
Incomplete primary	662	4.5%	3,679	2,047
Incomplete secondary	1,732	11.7%	4,399	2,913
None	97	0.7%	3,234	2,694
Formalidad				
Formal	8,894	60.2%	10,990	16,350
Informal	5,870	39.8%	4,833	7,466

Results

Figure 1: Descriptive Statistic Continuos variables



Results

	Log Monthly Labor Income		
	Linear	Quadratic (Unconditional)	Quadratic (Conditional)
	(1)	(2)	(3)
Constant	14.0***	12.4***	12.8***
	(0.023)	(0.064)	(0.070)
Age	-0.003***	0.084***	0.070***
	(0.0006)	(0.003)	(0.003)
Age squared		-0.001***	-0.0008***
		(3.76×10^{-5})	(3.43×10^{-5})
Total hours worked			0.013***
			(0.0004)
= Privatesectoremployee			-0.756***
			(0.034)
= Self-employed			-1.24***
			(0.035)
= Domesticworker			-1.45***
			(0.047)
= Employer			-0.529***
			(0.049)
= Other			-1.94***
			(0.281)
= Daylaborer			-1.41*
			(0.790)
Number of observations	14,764	14,764	14,764
R^2	0.00187	0.05000	0.22643
Adjusted R^2	0.00180	0.04987	0.22596
Root Mean Squared Error	0.89556	0.87370	0.78841

Discussion

1. Evidence of a Non-Linear and Concave Age–Income Profile

The quadratic specifications show a positive coefficient on age and a negative coefficient on age^2, generating a **concave age–earnings profile**. There is clear evidence of an **earnings peak within the observed age range**, around 40 years.

In contrast, the linear model fails to capture this non-linearity and exhibits very low explanatory power.

- Results are consistent with the theory: "Earnings rise at a diminishing rate over the working life, and decline when net investment becomes negative, as in old age. The typical (logarithmic) working-life earnings profile is, therefore, concave" (Mincer, 1974)

Discussion

2. Effect of Conditioning on Hours Worked and Employment Type

Including controls for hours worked and employment type shifts the estimated **earnings peak to slightly older ages (approximately 41–43 years)** and substantially improves model fit.

This suggests that part of the observed non-linearity is driven by differences in labor intensity and occupational structure, rather than solely by human capital accumulation.

3. Economic Interpretation in the Context of Bogotá's Labor Market

The results support the theoretical prediction of a concave life-cycle earnings profile. However, the shape of the profile is influenced by labor market characteristics such as occupational heterogeneity and variation in working hours.

Overall, the observed age–income pattern reflects both experience accumulation and structural labor market factors.

References

Mincer, J. A. (1974). Schooling, Experience, and Earnings. National Bureau of Economic Research.