

Social Mobility and Economic Development

Evidence from a Panel of Latin American Regions

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The logo for ZEW (Zentrum für Europäische Wirtschaftsforschung) is displayed in a large, bold, blue sans-serif font.

This paper...

**tests the equity-efficiency trade-off
regarding social mobility**

Theoretical argument More social mobility should lead to a **more efficient accumulation and allocation of human capital**, and, hence, improve economic performance (Barro, 1991; Hanushek/Woessmann, 2008; Galor/Tsiddon, 1997; Hassler/Mora, 2000)

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→ **is social mobility a driver of economic development?**

Equity-Efficiency Trade-Off

State of the art

contrasting findings on the **inequality-growth** nexus

(Berg et al., 2018; Brueckner et al., 2018; Neves et al., 2016; Neves and Silva, 2014; Barro, 2000; Banerjee and Duflo, 2003; Panizza, 2002; van der Weide and Milanovic, 2018; Voitchovsky, 2005)

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evidence on the **opportunity-efficiency** nexus scant

(Ferreira et al., 2018; Marrero and Rodriguez, 2013)

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positive correlation between **mobility and economic indicators**

(Chetty et al., 2014; Fan et al., 2015; Güell et al., 2018; Neidhöfer et al., 2018; Aiyar and Ebeke, 2020; Aghion et al., 2019; Aydemir and Yazici, 2019; Bradbury and Triest, 2016)

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Our Contribution

first to test the **role of social mobility for economic development**

Contribution

- 1 Build **unique dataset of (subnational) region-year observations** for 10 Latin American countries
 - **intergenerational education mobility** of cohorts 1940-89
 - average income and other **development indicators** 1981-2018
- 2 Novel way to **link cohort- and year-level** measures (measure mobility when it actually matters)
- 3 Test **social mobility** \Rightarrow **economic development**
- 4 Geography of social mobility for Latin America

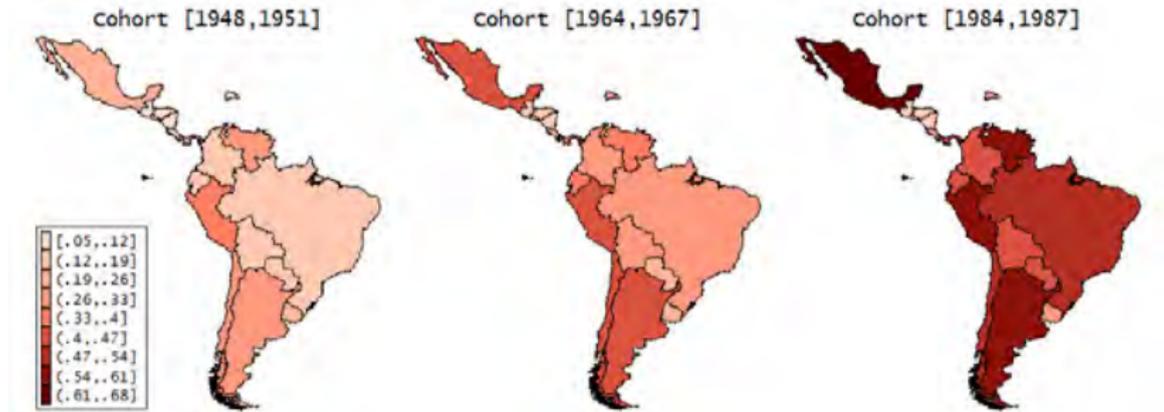
Social Mobility and Economic Development

- 1 The Latin American Context
- 2 Data & Measurement
- 3 Social Mobility in Latin America (*skipped in this talk*)
 - Trends & Geography
- 4 Social Mobility → Economic Development

The Latin American Context

Upward mobility

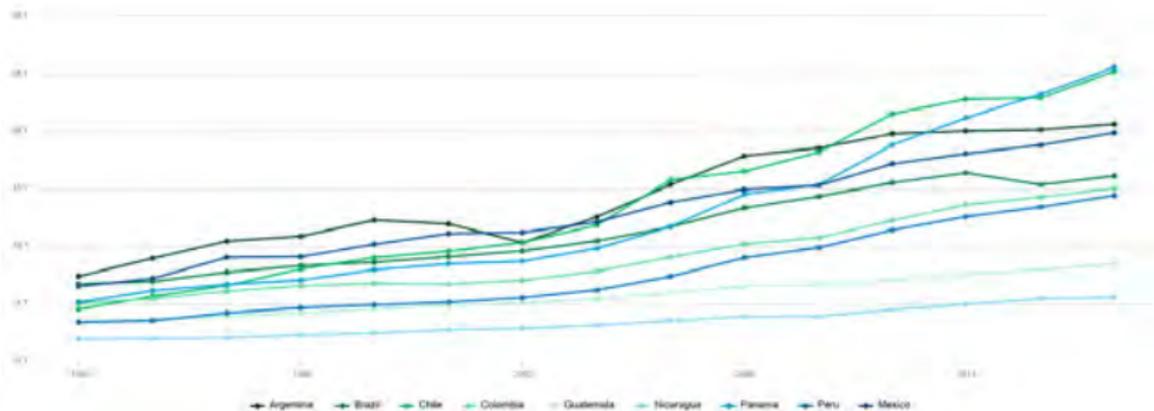
Rising probability of children from poor families to complete secondary education



Source: Neidhöfer, G., Serrano, J., & Gasparini, L. (2018). Educational inequality and intergenerational mobility in Latin America: A new database. *Journal of Development Economics*, 134, 329-349.

The Latin American Context

Economic Growth



Series : GDP per capita, PPP (current international \$)

Source: World Development Indicators

Created on: 12/30/2019

Data

10 countries

52 regions



Data

- 1 Estimate **intergenerational mobility** for cohorts 1940-1990 by subnational regions measures
 - surveys that include retrospective questions on **parental education (N~1.1 million)**

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 - Main:** Per capita household income (in PPP)

Data

- 1 Estimate **intergenerational mobility** for cohorts 1940-1990 by subnational regions measures
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- 2 Estimate **aggregate macroeconomic indicators** of development 1981-2018 (using other household surveys or other data sources)
 - Main:** Per capita household income (in PPP)
- 3 **Match** by region-year using novel weighting procedure based on **cohort-participation profiles**

Estimation strategy

$$Y_{ict} = \alpha + \gamma M_{ict} + \delta X_{ict} + \tau_t + v_i + \epsilon_{ict}$$

- Y *log* income of region i (country c) in year t
- X control variables (total population, urbanization, income inequality, migration ...)
- M social intergenerational mobility**

Estimation strategy

$$Y_{ict} = \alpha + \gamma M_{ict} + \delta X_{ict} + \tau_t + v_i + \epsilon_{ict}$$

$$M_{ict} = \sum_{b=1}^B w_{bct} m_{bic}$$

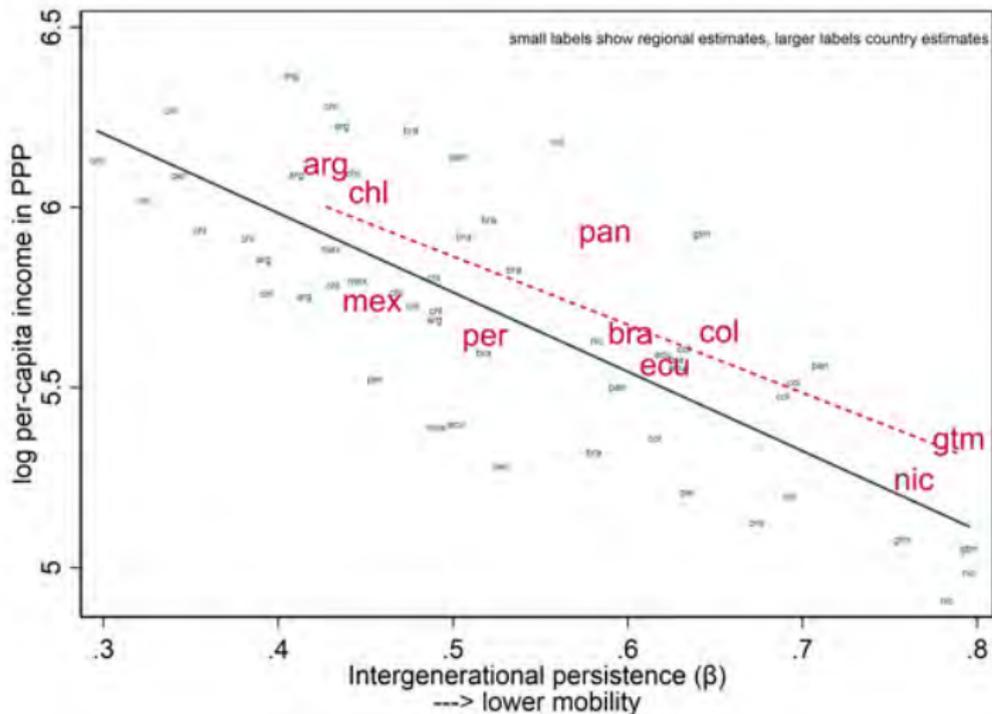
- M_{ict} (social mobility in each year t) is the **weighted average mobility** of people born 1940-1989 (cohort $b = 1, \dots, B$)

$$w_{bct} = \frac{\left(\frac{y_{bct}}{y_{ct}^{max}}\right)}{\sum_{b=1}^B \left(\frac{y_{bct}}{y_{ct}^{max}}\right)}$$

- weights mirror the **cohort's contribution to the economy** in each year t

Social Mobility and Economic Development

average over period 1981-2018



Main Results

Dep.variable: log per-capita income | $M = \log(\beta)$ (intergenerational persistence)

	(1)	(2)	(3)	(4)	(5)
M (w)	-1.205*** (0.423)	-1.202*** (0.423)	-2.025*** (0.342)	-2.093*** (0.199)	-2.810*** (0.317)
M (w) × Inequality (Gini)					-1.146*** (0.367)
<i>Controls</i>					
Inequality (Gini)		0.503*** (0.171)	0.620*** (0.154)	0.692*** (0.166)	-0.164 (0.315)
Migrant share (w)			0.524*** (0.154)	0.549*** (0.136)	0.522*** (0.135)
Average years of education (w)			1.332*** (0.327)	1.413*** (0.386)	1.412*** (0.388)
Region and Time F.E.	X	X	X	X	X
Year level:					
- Population, Urban share		X	X	X	X
Initial conditions:					
- GDP p.c., Population, Temperature, Precipitation				X	X
Observations	1451	1451	1363	1363	1363
Adjusted R^2	0.905	0.907	0.918	0.922	0.924

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Social mobility and...
other measures of development



Social mobility and...

other measures of development

Dep.variable: *in column title* | $M = \log(\beta)$

higher persistence →

	Luminosity	Poverty	Employment	Formality	Literate	Water	Electricity	Child Mortality
M (w)	-0.348*** (0.0719)	2.748** (1.081)	-0.212* (0.122)	-2.589*** (0.531)	-0.177*** (0.0413)	-0.787*** (0.136)	-0.688*** (0.122)	0.695* (0.406)
Region and Time F.E.	X	X	X	X	X	X	X	X
Year level controls	X	X	X	X	X	X	X	X
Cohort level controls	X	X	X	X	X	X	X	X
Initial conditions	X	X	X	X	X	X	X	X
Observations	994	1261	1261	1125	1261	1180	1036	866

Outcomes: **Luminosity** log average lights per pixel, **Poverty** line 2USD, **Employment**, **Formality**, **Literate** people able to write and read, (households with access to) **Water/Electricity**, houses made of **Precarious** materials, **Child Mortality** (<1 year old)

Social Mobility and Economic Development

To sum up...

just one slide left

Main findings

Social mobility has been a driver of economic development in Latin America

- Higher mobility consistently associated with rising income per capita (and other indicators)
- Migration, human capital accumulation, and initial conditions does not explain the effect

Inequality is particularly detrimental if paired with low levels of social mobility

Main findings

Social mobility has been a driver of economic development in Latin America

- Higher mobility consistently associated with rising income per capita (and other indicators)
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Policy implication

- there is no equity-efficiency trade-off, rather the opposite
- intervention that increases opportunities, but causes inefficiencies in the short-run, may still be efficient in the long-run

Social Mobility and Economic Development

Discussion

- endogeneity
- non-linearities

Discussion: Endogeneity

- results obtained with other persistence measures are **robust**
- **no reverse causality**
- **minor role of culture and institutions** (analysis within sub-national regions over time)
- we **control for migration, human capital accumulation, initial conditions**

still some potential **endogeneity** due to confounders possible

Discussion: Endogeneity

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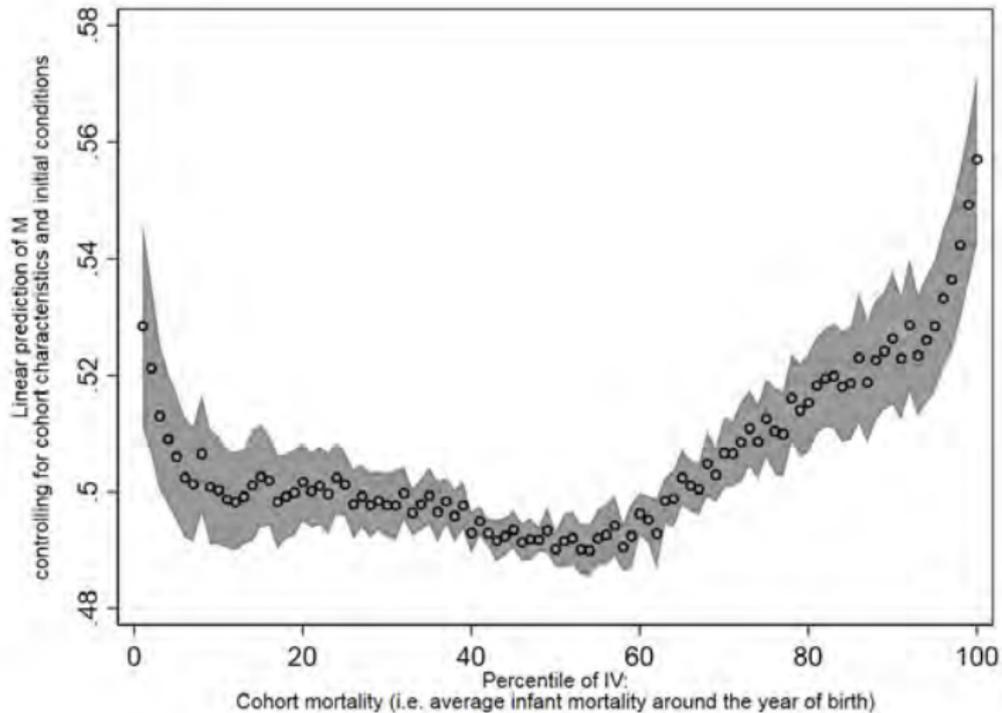
still some potential **endogeneity** due to confounders possible

Instrument for mobility to account for endogeneity
(omitted variable bias)

- ***Quantity-Quality tradeoff*** (Becker/Lewis, 1973)
Random shock to the number of children

Endogeneity

Instrument Cohort survival rate
(infant mortality around year of birth)



Endogeneity

Instrument Cohort survival rate
(infant mortality around year of birth)

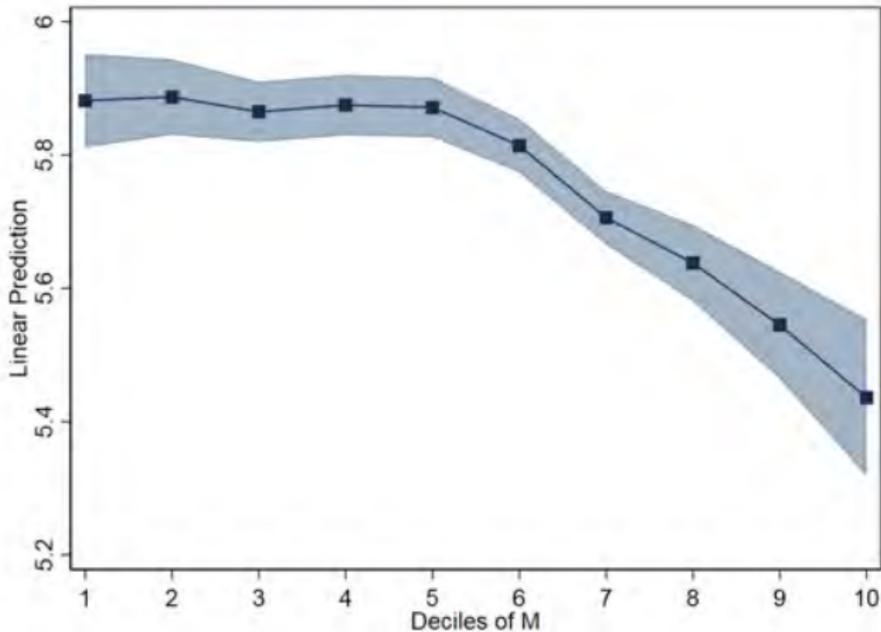
Dep.variable (second stage): log per-capita income

	First Stage	Second Stage	First Stage	Second Stage
M (w)		-3.452*** (0.814)		-1.984*** (0.583)
IV	8.370*** (2.184)		18.70*** (2.131)	
IV × IV	-3.425*** (0.740)		-6.519*** (0.720)	
IV × IV × IV	0.589*** (0.111)		0.989*** (0.107)	
IV × IV × IV × IV	-0.0366*** (0.00620)		-0.0552*** (0.00592)	
Region and Time FE	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Observations	1363	1363	1363	1363
Fstat	102.8		65.78	

Discussion: Non-linearities

Dep.variable: log per-capita income | $M = \log(\beta)$

higher persistence →



don't worry, this is my last slide!

Social Mobility and Economic Development

***Thank you for your attention!
Your comments are very welcome!***



Project funded by SEEK (Strengthening Efficiency and Competitiveness in the European Knowledge Economies)



APPENDIX

Intergenerational mobility measures

Transition probabilities

The probability of upward mobility

$$UM = Prob(y^c \geq s | y^p < s) \quad (1)$$

and the probability of top persistence

$$TP = Prob(y^c \geq s | y^p \geq s) \quad (2)$$

Relative risk

$$RR = \ln\left(\frac{TP}{UM}\right) \quad (3)$$

Slope coefficient and intergenerational correlations

$$y^c = \alpha + \beta \cdot y^p + \gamma X + \epsilon \quad (4)$$

$$\rho = \beta \frac{\sigma^p}{\sigma^c} \quad (5)$$

Absolute Mobility

Dep.variable: log per-capita income | $M = UM$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
M (w)	1.137*** (0.0330)	0.788*** (0.220)	0.916*** (0.218)	1.215*** (0.145)	1.506*** (0.150)	3.335*** (0.514)	1.706*** (0.207)
M (w) × M (w)						0.839*** (0.204)	
M (w) × Inequality (Gini)							0.433 (0.301)
Urban Population			-0.0790 (0.117)	-0.271** (0.125)	-0.184 (0.117)	0.0108 (0.126)	-0.228* (0.119)
Population			1.587*** (0.592)	1.416** (0.606)	0.998* (0.599)	1.651** (0.666)	0.953* (0.577)
Population × Population			-0.0547*** (0.0208)	-0.0495** (0.0209)	-0.0361* (0.0208)	-0.0600** (0.0233)	-0.0340* (0.0200)
Inequality (Gini)			0.520*** (0.175)	0.594*** (0.160)	0.698*** (0.166)	0.682*** (0.166)	1.156*** (0.369)
Migrant share (w)				0.264 (0.173)	0.750*** (0.152)	0.598*** (0.144)	0.769*** (0.146)
Variance of education (w)				0.0159 (0.228)	-0.210 (0.239)	0.809*** (0.269)	-0.321 (0.249)
Average years of education (w)				0.764* (0.388)	0.530 (0.351)	0.717** (0.353)	0.649* (0.365)
GDPpc (w)					0.217*** (0.0657)	0.185*** (0.0590)	0.205*** (0.0641)
Population 1940-89 (w)					-1.146*** (0.402)	-1.131*** (0.409)	-1.050*** (0.396)
Population 1940-89 (w) × Population 1940-89 (w)					0.0410*** (0.0126)	0.0444*** (0.0133)	0.0368*** (0.0124)
Temperature 1940-89 (w)					1.069*** (0.339)	0.724** (0.345)	1.105*** (0.337)
Temperature 1940-89 (w) × Temperature 1940-89 (w)					-0.0394*** (0.00938)	-0.0313*** (0.00920)	-0.0401*** (0.00925)
Precipitation 1940-89 (w)					-0.153** (0.0615)	-0.128** (0.0539)	-0.149** (0.0615)
Precipitation 1940-89 (w) × Precipitation 1940-89 (w)					0.00390* (0.00219)	0.00307 (0.00197)	0.00403* (0.00219)
Constant	6.551*** (0.0590)	6.231*** (0.276)	-4.655 (4.236)	-4.426 (4.825)	0.992 (5.347)	-3.184 (5.732)	0.590 (5.314)
Country	Yes	No	No	No	No	No	No

Relative Mobility

Dep.variable: log per-capita income | $M = RR$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
M (w)	-1.050*** (0.0305)	-1.072*** (0.171)	-1.110*** (0.176)	-1.193*** (0.120)	-1.079*** (0.104)	-2.785*** (0.564)	-1.293*** (0.200)
M (w) × M (w)						0.705*** (0.208)	
M (w) × Inequality (Gini)							-0.419 (0.314)
Urban Population			-0.0105 (0.121)	-0.203 (0.131)	-0.142 (0.126)	-0.00557 (0.127)	-0.190 (0.124)
Population			0.463 (0.608)	0.802 (0.611)	0.677 (0.627)	1.034 (0.691)	0.666 (0.608)
Population × Population			-0.0192 (0.0213)	-0.0306 (0.0214)	-0.0263 (0.0219)	-0.0402* (0.0243)	-0.0254 (0.0212)
Inequality (Gini)			0.539*** (0.176)	0.586*** (0.161)	0.679*** (0.169)	0.703*** (0.171)	1.062*** (0.332)
Migrant share (w)				0.296* (0.161)	0.582*** (0.144)	0.382*** (0.140)	0.612*** (0.139)
Variance of education (w)				-0.275 (0.227)	-0.556** (0.257)	0.0475 (0.244)	-0.627** (0.261)
Average years of education (w)				0.968*** (0.356)	1.270*** (0.374)	1.064*** (0.351)	1.322*** (0.376)
GDPpc (w)					0.200*** (0.0614)	0.221*** (0.0601)	0.189*** (0.0596)
Population 1940-89 (w)					-0.499 (0.393)	-0.419 (0.391)	-0.430 (0.389)
Population 1940-89 (w) × Population 1940-89 (w)					0.0136 (0.0120)	0.0126 (0.0121)	0.0108 (0.0119)
Temperature 1940-89 (w)					0.812** (0.357)	0.569 (0.363)	0.875** (0.359)
Temperature 1940-89 (w) × Temperature 1940-89 (w)					-0.0326*** (0.00994)	-0.0258*** (0.00991)	-0.0341*** (0.00983)
Precipitation 1940-89 (w)					-0.279*** (0.0674)	-0.302*** (0.0664)	-0.265*** (0.0674)
Precipitation 1940-89 (w) × Precipitation 1940-89 (w)					0.00650*** (0.00239)	0.00678*** (0.00232)	0.00636*** (0.00236)
Constant	6.216*** (0.0513)	6.392*** (0.181)	4.303 (4.411)	0.663 (4.597)	2.086 (5.622)	0.669 (5.936)	1.244 (5.709)
Country	Yes	No	No	No	No	No	No
Region	No	Yes	Yes	Yes	Yes	Yes	Yes

Correlation coefficient

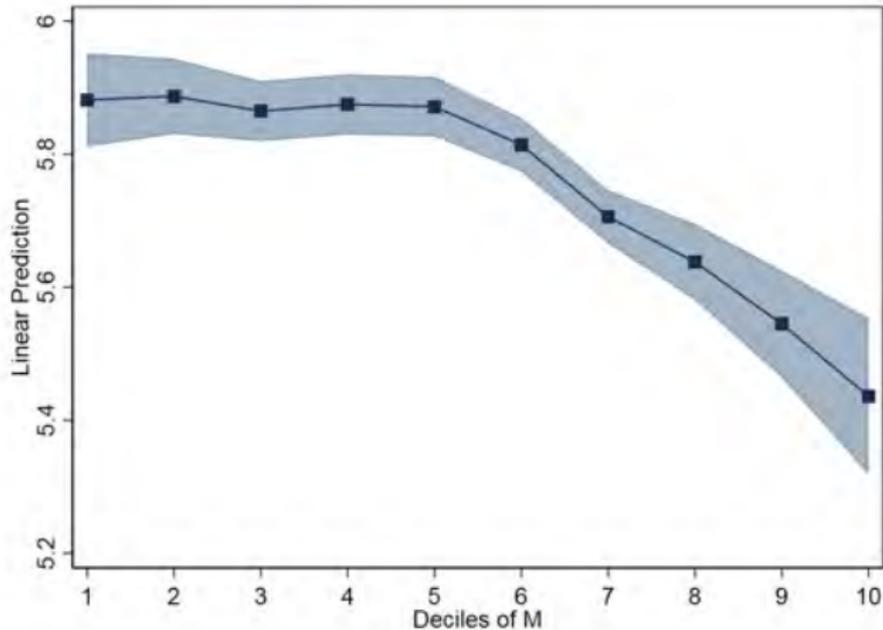
Dep.variable: log per-capita income | $M = RR$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
M (w)	-0.173* (0.0881)	-0.260 (0.229)	-0.348 (0.238)	-0.724*** (0.204)	-0.538** (0.208)	0.167 (1.268)	-1.018** (0.468)
M (w) × M (w)						0.437 (0.779)	
M (w) × Inequality (Gini)							-0.649 (0.557)
Urban Population			0.00494 (0.119)	-0.163 (0.131)	-0.164 (0.128)	-0.158 (0.126)	-0.183 (0.123)
Population			0.291 (0.702)	0.764 (0.708)	0.738 (0.756)	0.781 (0.757)	0.769 (0.749)
Population × Population			-0.0108 (0.0243)	-0.0277 (0.0242)	-0.0276 (0.0258)	-0.0291 (0.0258)	-0.0285 (0.0256)
Inequality (Gini)			0.529*** (0.179)	0.640*** (0.159)	0.688*** (0.168)	0.692*** (0.170)	0.210 (0.457)
Migrant share (w)				0.447** (0.176)	0.669*** (0.145)	0.678*** (0.152)	0.650*** (0.147)
Variance of education (w)				-0.665*** (0.248)	-1.060*** (0.295)	-1.077*** (0.296)	-1.067*** (0.295)
Average years of education (w)				2.262*** (0.401)	2.454*** (0.420)	2.447*** (0.417)	2.490*** (0.419)
GDPpc (w)					0.294*** (0.0793)	0.297*** (0.0795)	0.293*** (0.0786)
Population 1940-89 (w)					-0.0294 (0.406)	-0.0566 (0.419)	0.0870 (0.430)
Population 1940-89 (w) × Population 1940-89 (w)					-0.00498 (0.0139)	-0.00395 (0.0144)	-0.00913 (0.0145)
Temperature 1940-89 (w)					0.305 (0.358)	0.299 (0.357)	0.356 (0.361)
Temperature 1940-89 (w) × Temperature 1940-89 (w)					-0.0188* (0.0101)	-0.0188* (0.0101)	-0.0198* (0.0101)
Precipitation 1940-89 (w)					-0.319*** (0.0743)	-0.331*** (0.0807)	-0.300*** (0.0762)
Precipitation 1940-89 (w) × Precipitation 1940-89 (w)					0.00511** (0.00226)	0.00537** (0.00240)	0.00477** (0.00230)
Constant	4.914*** (0.0800)	5.080*** (0.181)	3.504 (5.082)	-2.836 (5.344)	0.322 (6.610)	0.674 (6.683)	-1.871 (7.143)

Non-linearities

Dep.variable: log per-capita income | $M = \log(\beta)$

higher persistence →



Social Mobility and Economic Development

Human Capital Accumulation or Allocation ?

Accumulation or Allocation

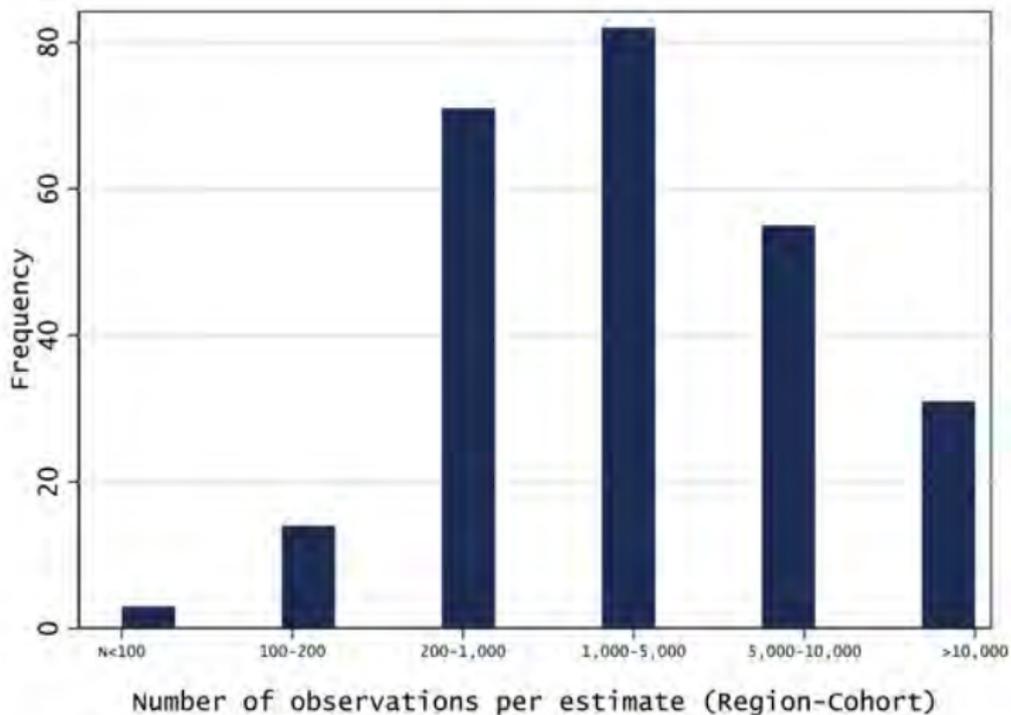
	(1)	(2)	(3)	(4)
Upward Mobility (w)	1.716*** (0.211)			1.514*** (0.150)
Top Persistence (w)		1.812*** (0.414)	0.423 (0.274)	-0.0887 (0.241)
Average years of education (w)			2.369*** (0.389)	0.546 (0.340)
Region and Time FE	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes
Observations	1363	1363	1363	1363

TP = (Probability to complete secondary | High educated parents)

UM = (Probability to complete secondary | Low educated parents)

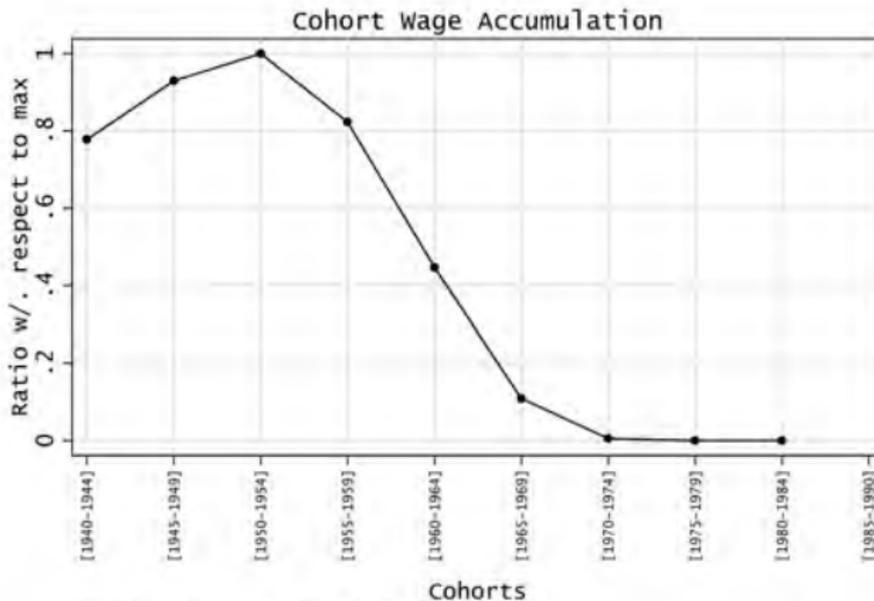
Data

Intergenerational mobility estimates



Weight-Structure

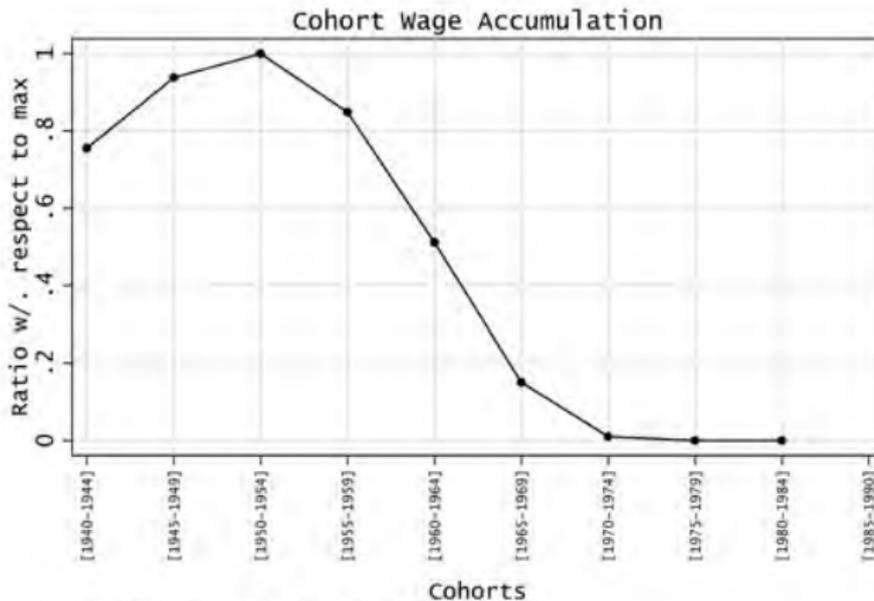
Brazil



Source: PNAD-1981, own estimates.

Weight-Structure

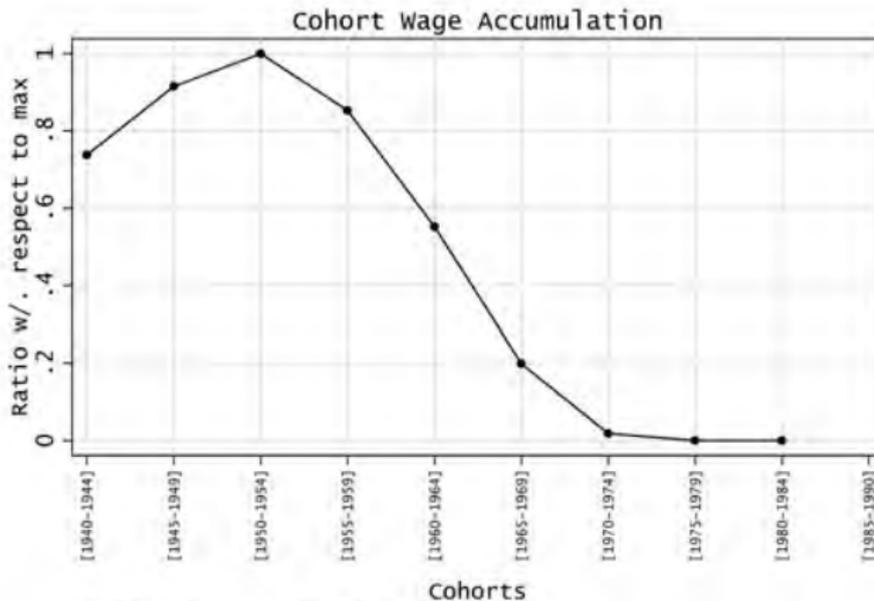
Brazil



Source: PNAD-1982, own estimates.

Weight-Structure

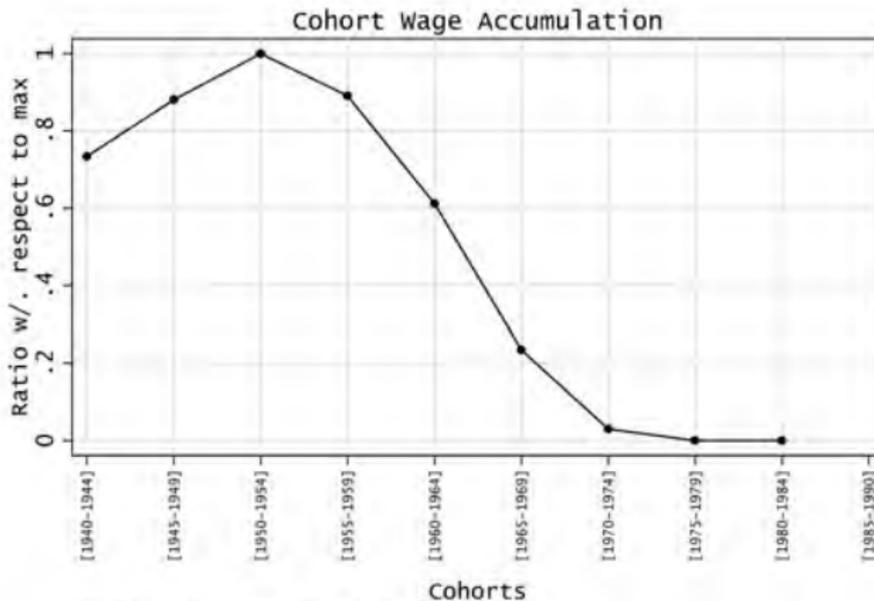
Brazil



Source: PNAD-1983, own estimates.

Weight-Structure

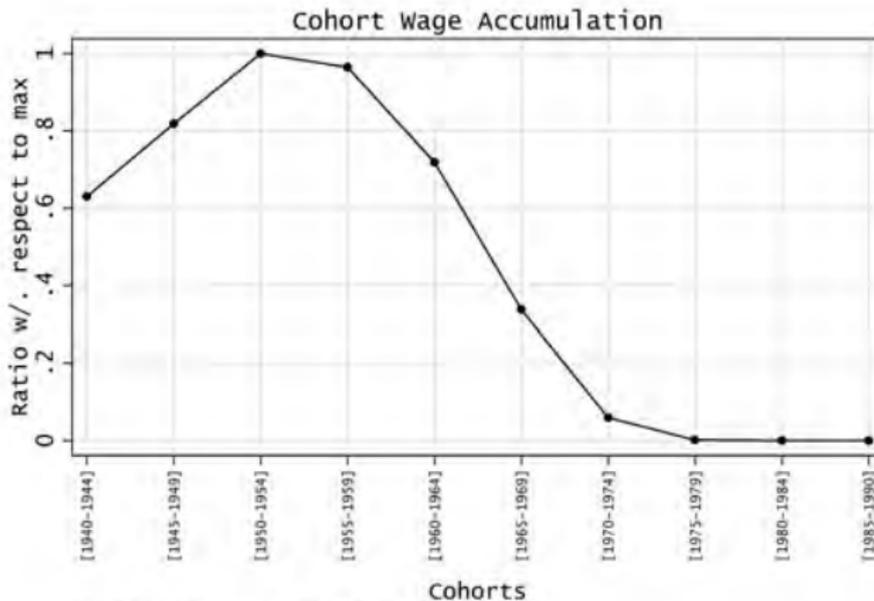
Brazil



Source: PNAD-1984, own estimates.

Weight-Structure

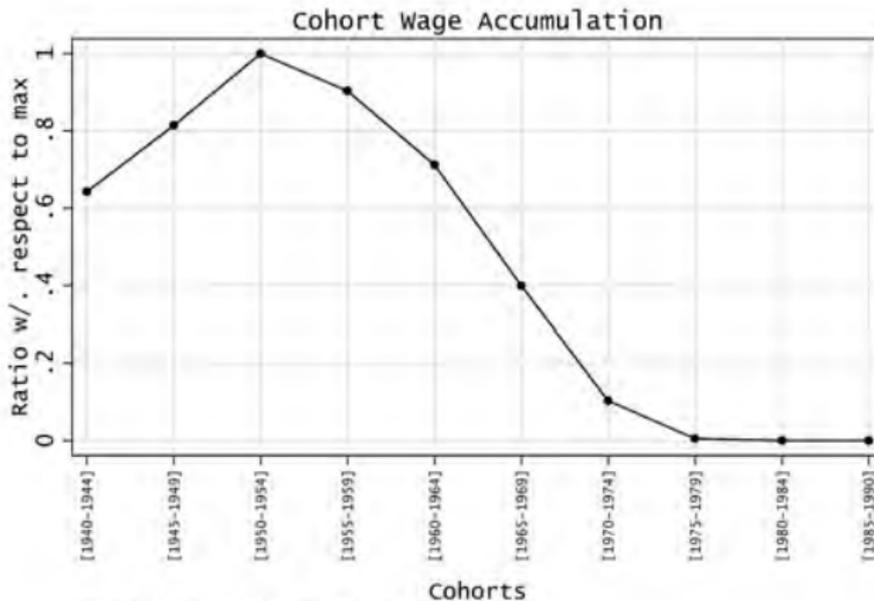
Brazil



Source: PNAD-1985, own estimates.

Weight-Structure

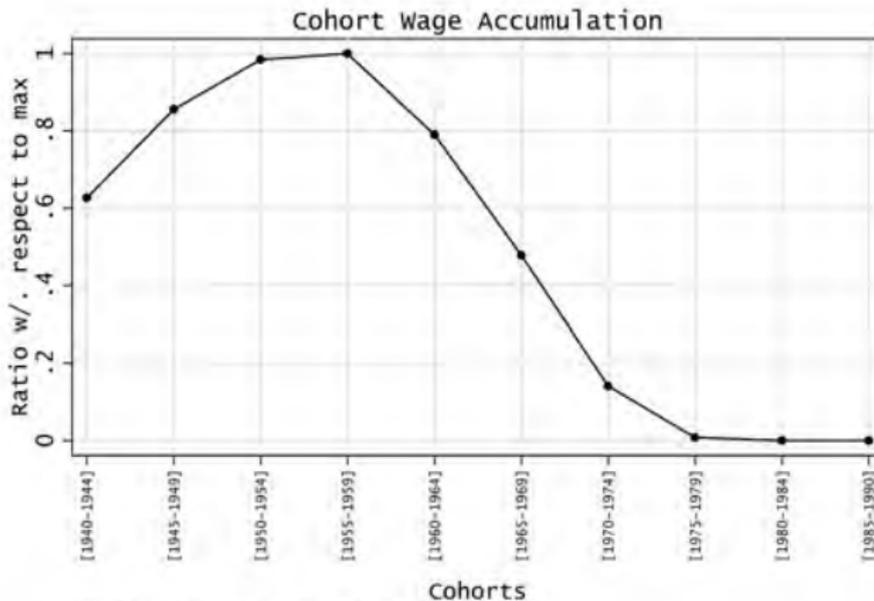
Brazil



Source: PNAD-1986, own estimates.

Weight-Structure

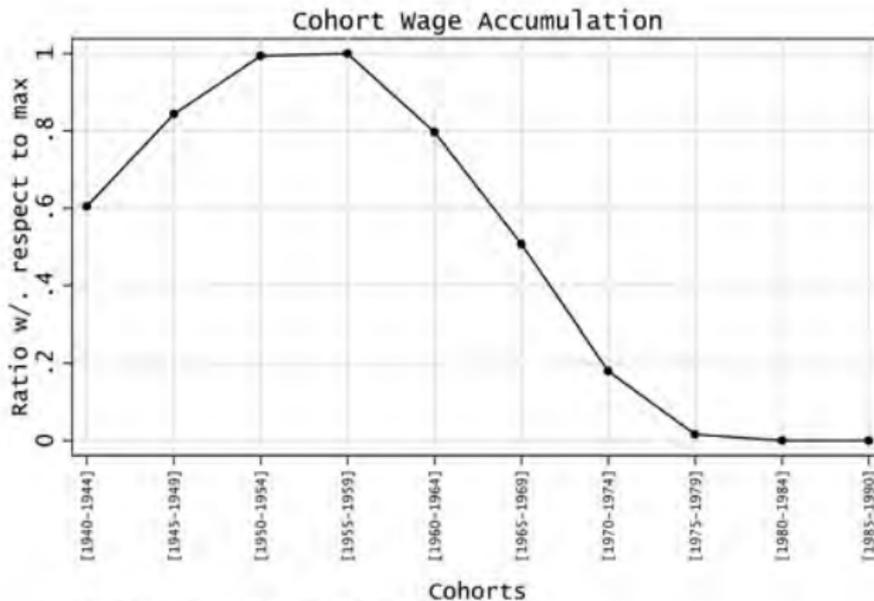
Brazil



Source: PNAD-1987, own estimates.

Weight-Structure

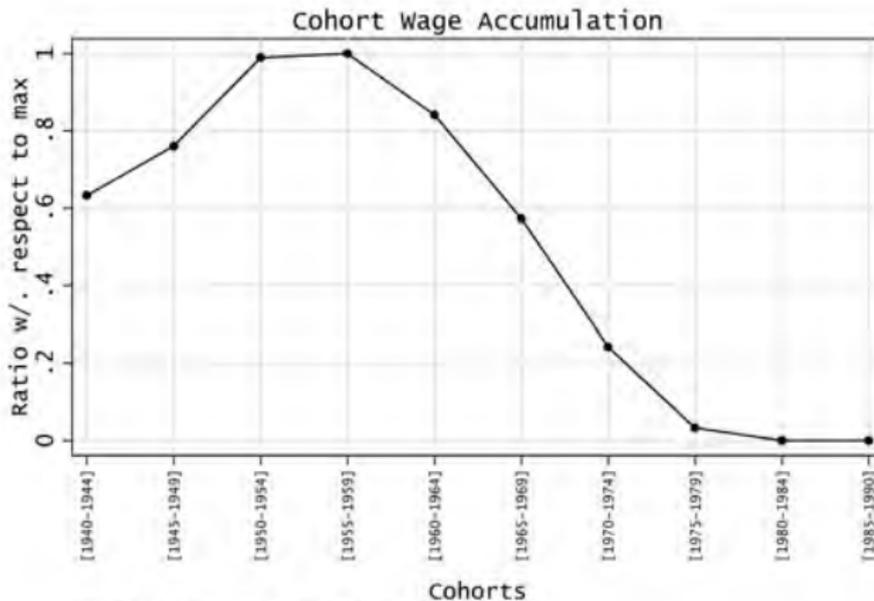
Brazil



Source: PNAD-1988, own estimates.

Weight-Structure

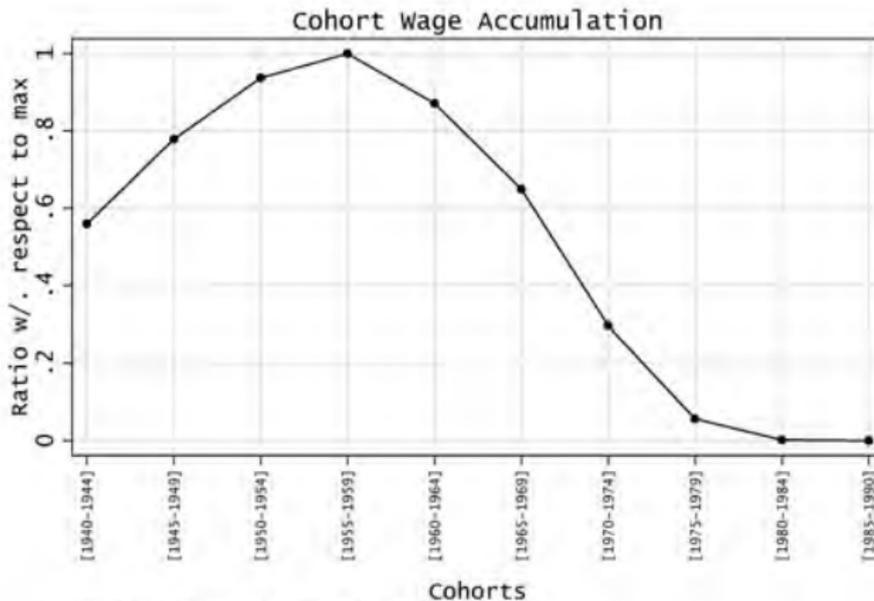
Brazil



Source: PNAD-1989, own estimates.

Weight-Structure

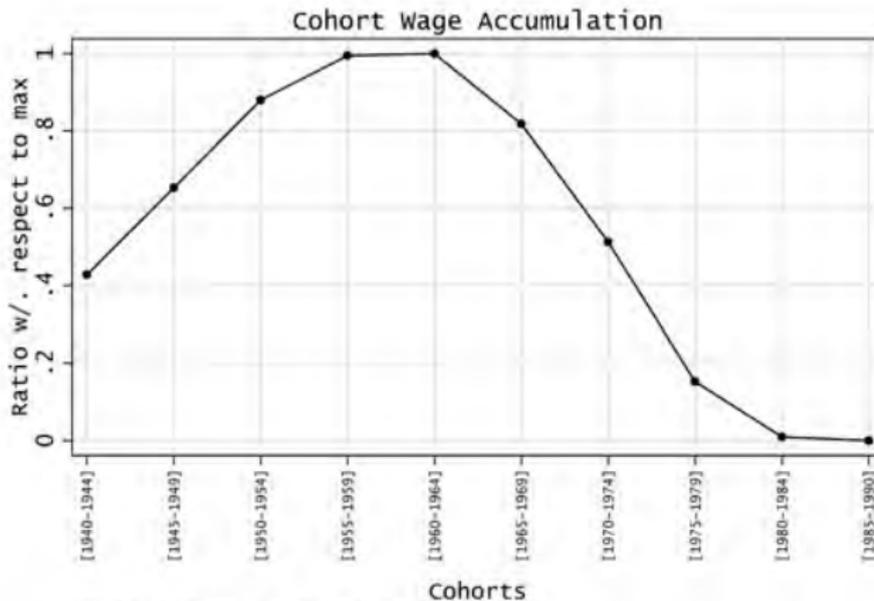
Brazil



Source: PNAD-1990, own estimates.

Weight-Structure

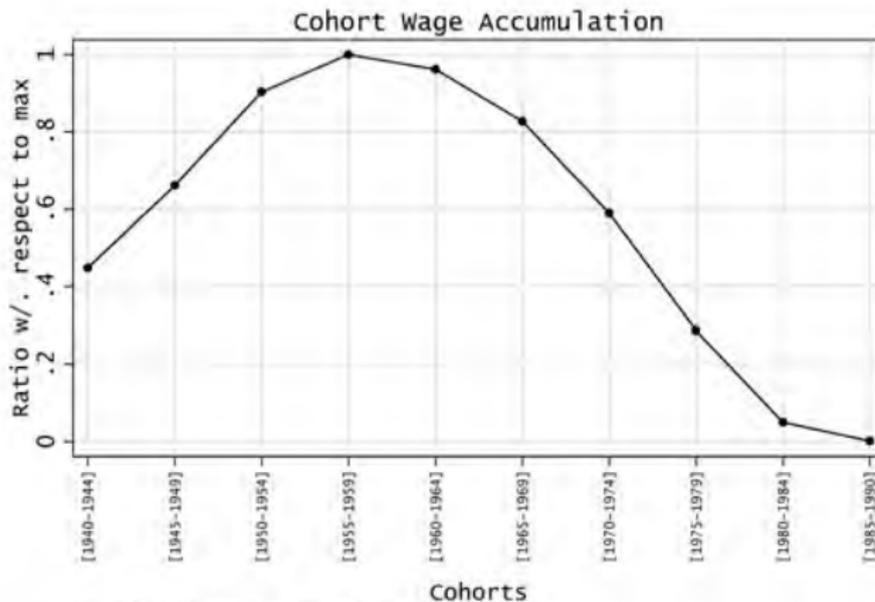
Brazil



Source: PNAD-1992, own estimates.

Weight-Structure

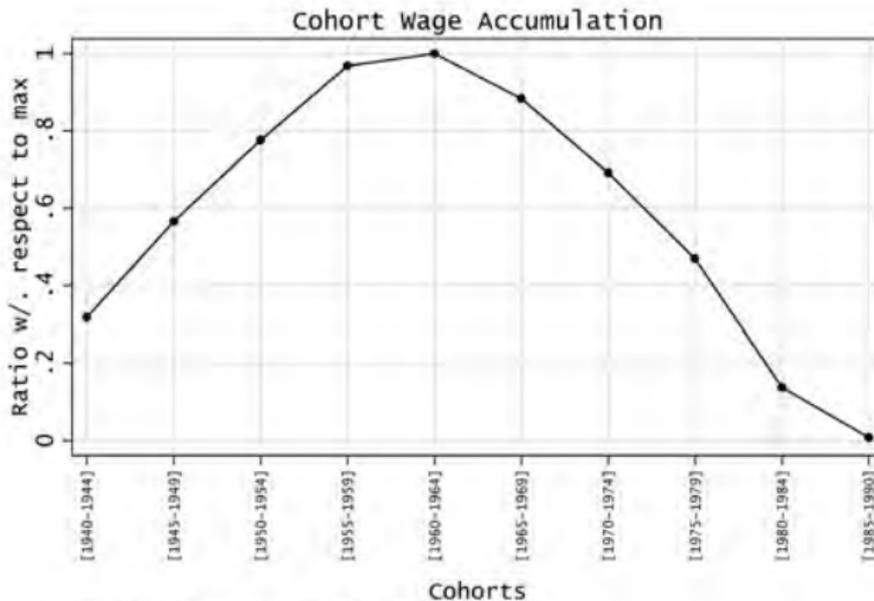
Brazil



Source: PNAD-1995, own estimates.

Weight-Structure

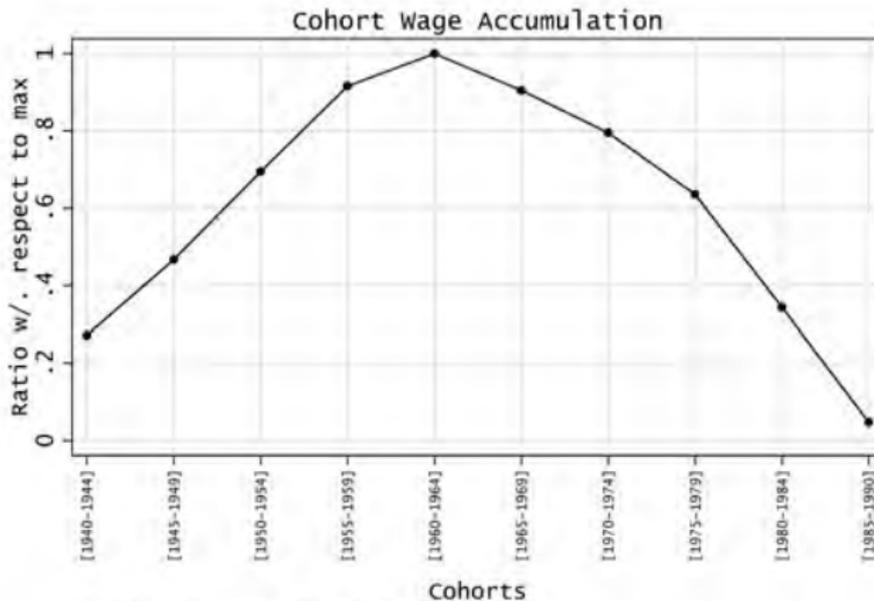
Brazil



Source: PNAD-1998, own estimates.

Weight-Structure

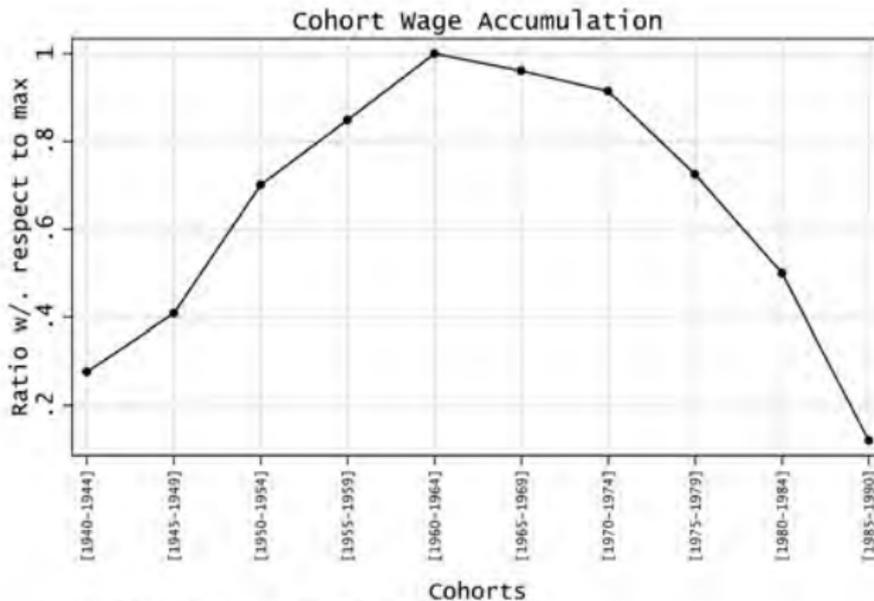
Brazil



Source: PNAD-2001, own estimates.

Weight-Structure

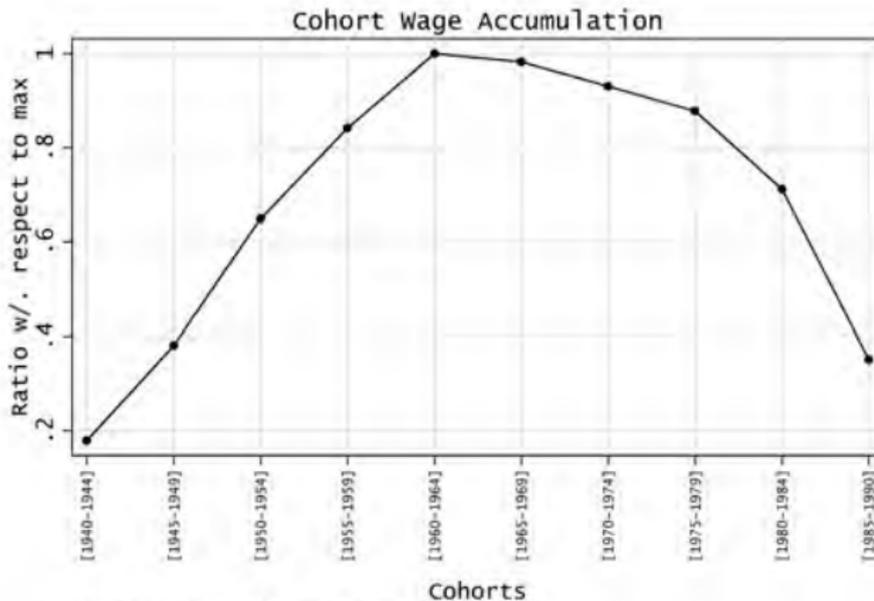
Brazil



Source: PNAD-2003, own estimates.

Weight-Structure

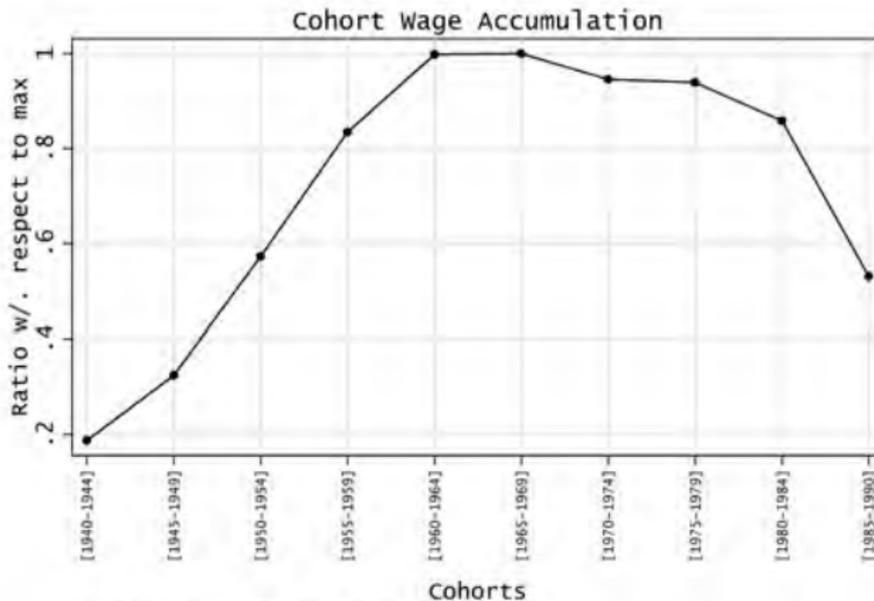
Brazil



Source: PNAD-2006, own estimates.

Weight-Structure

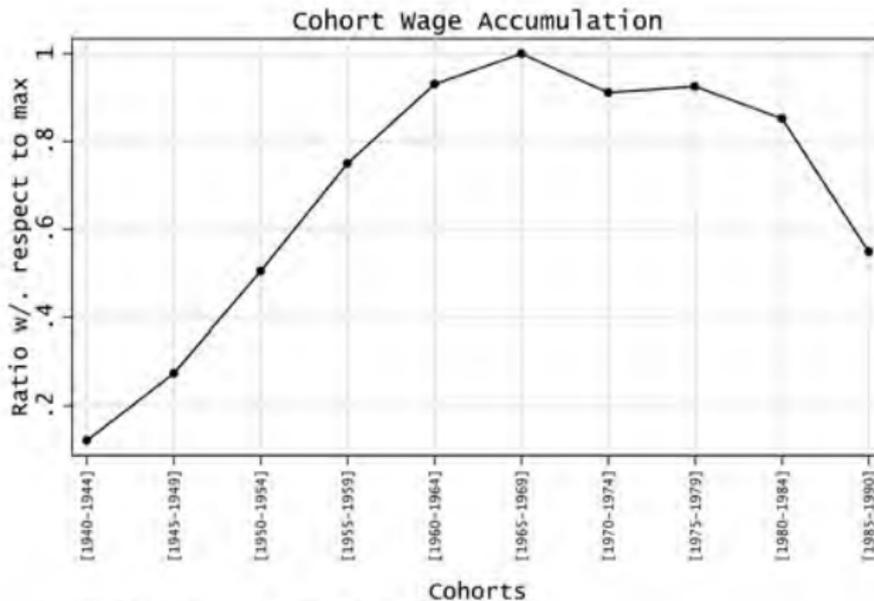
Brazil



Source: PNAD-2008, own estimates.

Weight-Structure

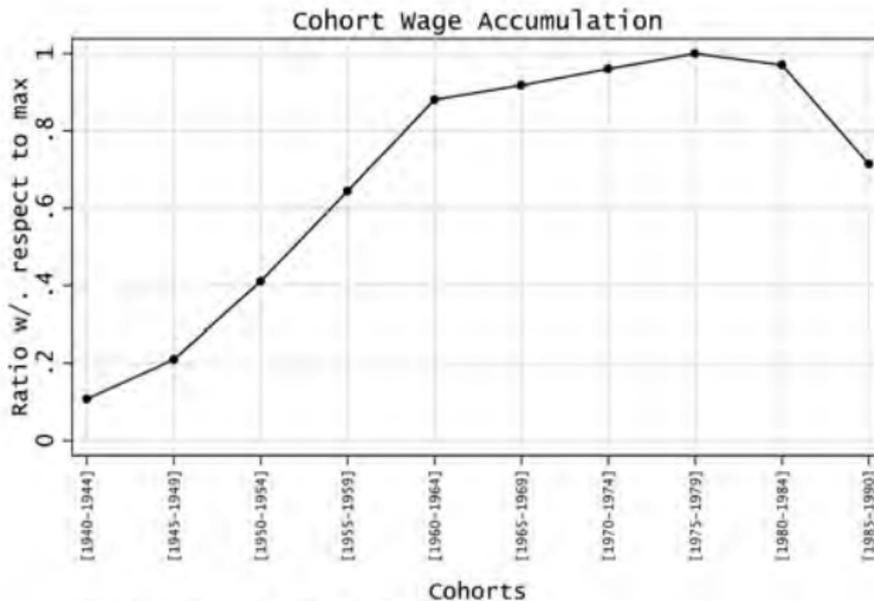
Brazil



Source: PNAD-2009, own estimates.

Weight-Structure

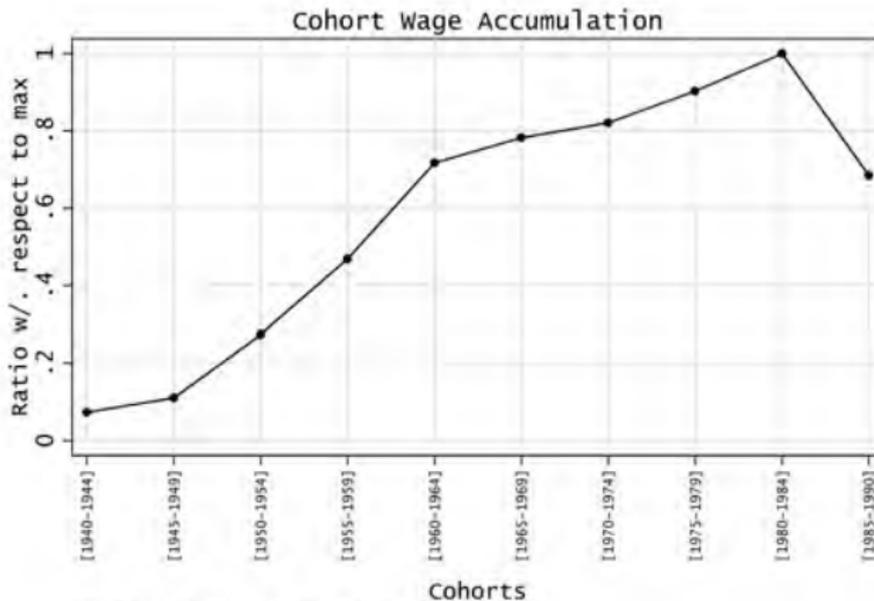
Brazil



Source: PNAD-2012, own estimates.

Weight-Structure

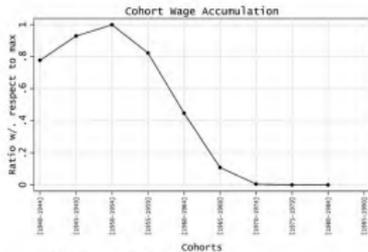
Brazil



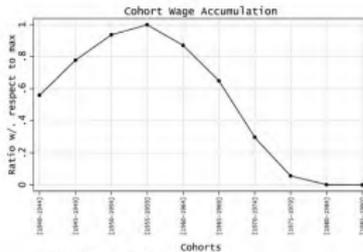
Source: PNAD-2015, own estimates.

Weight-Structure

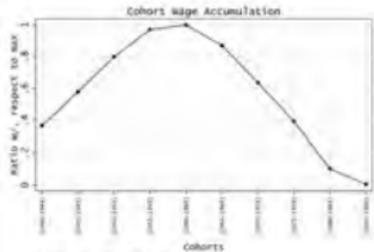
Brazil



Source: PNAD-1961, own estimates.



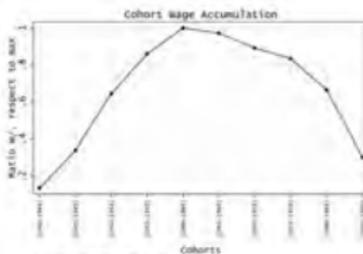
Source: PNAD-1990, own estimates.



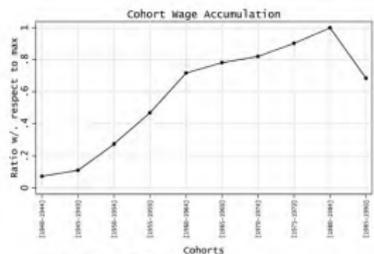
Source: PNAD-1997, own estimates.



Source: PNAD-2003, own estimates.



Source: PNAD-2007, own estimates.



Source: PNAD-2015, own estimates.