Learning from your neighbor: tax-benefit systems swaps in Latin America

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Motivation

- Latin American countries have experienced an important decrease in income inequality.

- Mainly associated with a decline in wage inequality.

- However, progressive tax-benefit reforms may have also played a role.

Aim

- Compare the redistributive role of tax-benefit systems in Latin American countries
  - Two neighboring countries: Ecuador and Colombia
  - Contrasting situations in terms of income distribution.
- Approach:
  - Compare counterfactual simulations whereby the system of a country is applied to the population of the other

Summary of main results

- The Ecuadorean tax-benefit system is more redistributive.

- If the Ecuadorean system was applied to the Colombian population…
  - ☐ Gini coefficient would decrease by 1.7 points in Colombia
  - ☐ Poverty rate would decrease by 10%
  - ☐ Elderly poverty would fall by 18.7%.

- The result relates to the more generous social (pension) assistance benefit in Ecuador.

Plan of the talk

- Introduction
- Methodology
- Empirical results
- Conclusion

1. Introduction

- The role played by the tax-benefit system varies widely across countries in Latin America.

- Ecuador and Colombia represent interesting case studies:
  - Middle ranked in terms of GDP per capita
  - Heavily dependent on oil exports
  - Contrasting trends in income inequality
  - Varying role of the tax-benefit system

Effect of the tax-benefit system on income inequality (2014)

	Inequality (Gini coefficient %)		
	Market income	Disposable income	Difference
Ecuador	50.1	46.2	-3.9
Colombia	59.2	56.4	-2.8

2. Methodology

- Data
- Tax-benefit simulations
- Decomposition

2.1. Data

- Representative household survey data from Ecuador and Colombia
- Ecuador
  - National Survey of Income and Expenditures of Urban and Rural Households (ENIGHUR 2011-2012)
  - 153,341 individuals
- Colombia
  - Quality of Life National Survey (ENCV 2014)
  - 67,332 individuals
- Surveys contain detailed information on personal and hh characteristics, employment, income and expenditures.
- Income concepts have been harmonized to achieve comparability in the simulations

2.2. Tax-benefit simulations (1)

- We use the newly developed tax-benefit microsimulation models ECUAMOD and COLMOD.
  - ☐ Implemented in the EUROMOD software to enable comparability in the simulations.
  - ☐ Simulate direct taxes, social insurance contributions and cash transfers for the household population in each country.
  - ☐ Static models: no behavioural reactions and no adjustments to population changes over time.
  - ☐ Models have been validated with respect to administrative statistics.
- Analysis takes 2014 policies as starting point
  - ☐ For Ecuador, market incomes and non-simulated instruments are adjusted to 2014 levels using source specific uprating factors.

2.2. Tax-benefit simulations (2)

Scope of the simulation: Taxes and SICs

ECUADOR	COLOMBIA
Employee Social Insurance Contributions	
• Simulated for those reporting affiliation	• Simulated for those reporting affiliation
• Total contribution rate either 9.45% or 11.45% depending on sector of work	• Total contribution rate is between 8% and 10% depending on employment income
• No SICs applied if income below min wage	• Min. and max contributions apply
Self-employed Social Insurance Contributions	
• Simulated for those reporting affiliation	• Simulated for those reporting affiliation
• Total contribution rate is 20.50%	• Total contribution rate is between 28.5%
• No SICs applied if income below min wage	• Min. and max contributions apply
Personal Income Tax	
• Simulated for all earners	• Simulated for all earners
• Deductions include personal expenditures in food, clothing, education, health, and housing	• Deductions include expenditure in education, health and mortgage payments
• Tax schedule formed of nine tax bands and rates between 0% and 35%	• Tax schedule formed of different bands contingent on the system applied, rates are between 0% and 33%

2.2. Tax-benefit simulations (3)

Scope of the simulation: Cash transfers

ECUADOR	COLOMBIA
Social Assistance benefits	
Human Development Transfer	*Familias en acción*
• Proxy means-tested based on a composite index	• Proxy means-tested based on a composite index
• Eligible: (i) poor families with children below 18 years; (ii) poor elderly not affiliated with social security; and (iii) poor persons severe disability, not affiliated with social security.	• Eligible: families with children below 18
• Amount: 50 USD per month	• Amount: (i) health component: 33-38 USD per month per family; (ii) education component: 11-24 USD per month per child for up to 3 children
Joaquín Gallegos Lara Transfer	*Colombia mayor*
• Benefit for persons caring for individuals with severe disability and/or illness	• Proxy means-tested based on a composite index
• Amount 240 USD per month	• Eligible: elderly older than 54 years (female) and 58 years (male) or more; no pension income
	• Amount: Between USD 21 and USD 59 per month depending on city/town

2.3. Decomposition (1)

- Approach draws on the methodology by Bargain (2012):
  - □ Differences in inequality for one country over two periods of time
  - □ Here, two countries at the same point in time
- Household disposable income can be represented by:

$$d_c(p_c, y_c).$$

  - □ y_c describes the population of country *c* (market income and socio-demographic characteristics).
  - □ p_c denotes the set of monetary parameters in the tax-benefit system of country *c*.
  - □ d_c denotes the tax-benefit function of country *c*.

- $I[d_c(p_c, y_c)]$ represents a welfare metric based on the distribution of disposable income.

2.3. Decomposition (2)

- Tax-benefit models allow us to represent counterfactual distributions, such as

$$d_2(p_2, \alpha y_1).$$

  The distribution of disposable income obtained by applying tax-benefit rules and parameters of country 2 on nominally adjusted data of country 1.

- The indexation parameter α allows us to take into account that the policies of a given country are specific to the overall level of income in the country.

2.3. Decomposition (3)

- The total difference in the welfare indicator I between country 1 and 2 can be represented by:

$$\Delta = I[d_2(p_2, y_2)] - I[d_1(p_1, y_1)].$$

- The difference can be decomposed into
  - The contribution of the change in the tax-benefit rules ('policy effect')
  - The contribution of changes in the underlying market distribution or other effects not linked to policy changes ('other effects')

2.3. Decomposition (4)

- Two alternative decompositions can be represented.
- Decomposition I:

$$\Delta = \{I[d_2(p_2, y_2)] - I[d_1(\alpha p_1, y_2)]\} \text{ (policy differences/gap)}$$
$$+ \{I[d_1(\alpha p_1, y_2)] - I[d_1(\alpha p_1, \alpha y_1)]\}\text{(other differences)}$$
$$+ \{I[d_1(\alpha p_1, \alpha y_1)] - I[d_1(p_1, y_1)]\} \text{ (income differences)}.$$

- Decomposition II:

$$\Delta = \{I[d_2(p_2, y_2)] - I[d_2(p_2, \alpha y_1)]\} \text{ (other differences)}$$
$$+ \{I[d_2(p_2, \alpha y_1)] - I[d_1(\alpha p_1, \alpha y_1)]\}\text{(policy differences)}$$
$$+ \{I[d_1(\alpha p_1, \alpha y_1)] - I[d_1(p_1, y_1)]\} \text{ (income differences)}.$$

2.3. Decomposition (5)

- If $d_c(p_c, y_c)$ is linearly homogenous in p_c and y_c , the third component of the decompositions should disappear

  - □ Simultaneous change in nominal levels of incomes and parameters should not affect the relative location of households in the distribution of disposable income

- In that case, the Shapley decomposition is obtained by averaging the contributions from the two alternative decompositions.

3. Empirical results

- Decomposition
- Marginal contribution of tax-benefit components

3.1. Decomposition results

data country:	EC	EC	CO	EC	CO			Decomposition I		Decomposition II		Shorrocks-Shapley Decomposition	
uprated:		Yes		Yes		Total difference	Homog-eneity check	Tax-benefit policy effect	Other effect	Tax-benefit policy effect	Other effect	Tax-benefit policy effect	Other effect
policy country	EC	EC	EC	CO	CO								
uprated:		Yes	Yes									Mean of (4)-(2), (3)-(1)	Mean of (2)-(1), (4)-(3)
	(0)	(1)	(2)	(3)	(4)	(4)-(0)	(1)-(0)	(4)-(2)	(2)-(1)	(3)-(1)	(4)-(3)		
Inequality													
Gini	46.2	46.2	54.7	48.2	56.4	10.2	0	1.7	8.5	1.9	8.3	1.8	8.4
Total poverty													
FGT0 (%)	18	18	32.9	20.7	36.3	18.2	0	3.4	14.8	2.6	15.6	3	15.2
Elderly poverty													
FGT0 (%)	21.3	21.3	28.6	28.3	35.2	13.9	0	6.6	7.3	7	6.9	6.8	7.1

Note: EC: Ecuador; CO: Colombia. Policy year 2014. Source: ECUAMOD version 1.0 and COLMOD version 1.0

3.2. Marginal contributions

	EC	EC	CO	EC	CO
data country:					
uprated:		Yes		Yes	
policy country:	EC	EC	EC	CO	CO
uprated:		Yes	Yes		
	(0)	(1)	(2)	(3)	(4)
◿*Gini coefficient*					
DPI minus social assistance	-1.4	-1.4	-1.8	-0.8	-1.1
DPI plus income tax	-1.1	-1.1	-1.3	-0.9	-0.7
DPI plus SICs	-1.3	-1.3	-1.1	0	-0.4
◿*Poverty headcount*					
DPI minus social assistance	-2.6	-2.6	-2.4	-1.3	-1.1
DPI plus income tax	0.1	0.1	0.2	0	0.2
DPI plus SICs	0.3	0.3	0.7	0.4	0.8
◿*Elderly poverty headcount*					
DPI minus social assistance	-8.2	-8.2	-7.3	-2.9	-2.9
DPI plus income tax	0.2	0.2	0.4	0.2	0.3
DPI plus SICs	0.1	0.1	0.5	0.5	0.7

Note: EC: Ecuador; CO: Colombia. DPI= Disposable Income. Policy year 2014
Source: ECUAMOD version 1.0 and COLMOD version 1.0

Conclusion

- Small but non-negligible redistributive role of tax-benefit systems in Ecuador and Colombia.

- Most differences in inequality and poverty are driven by differences in market income (and non-simulated instruments).

- Yet, the Ecuadorean system is more redistributive and would achieve a larger reduction in inequality and poverty if applied to the Colombian population.

- Social assistance benefits in Ecuador play a particularly important role.

- Future work should consider potential behavioural reactions or general equilibrium effects of "full-system" swaps.

Future work

- Apply decomposition approach to analyse changes in income inequality and poverty in African countries
  - Using SOUTHMOD.

- Apply policy swap methodology to study the effect of personal income tax in Latin American countries
  - Country models developed in a harmonized setting using EUROMOD for: Argentina, Bolivia, Mexico, Paraguay, Uruguay and Venezuela

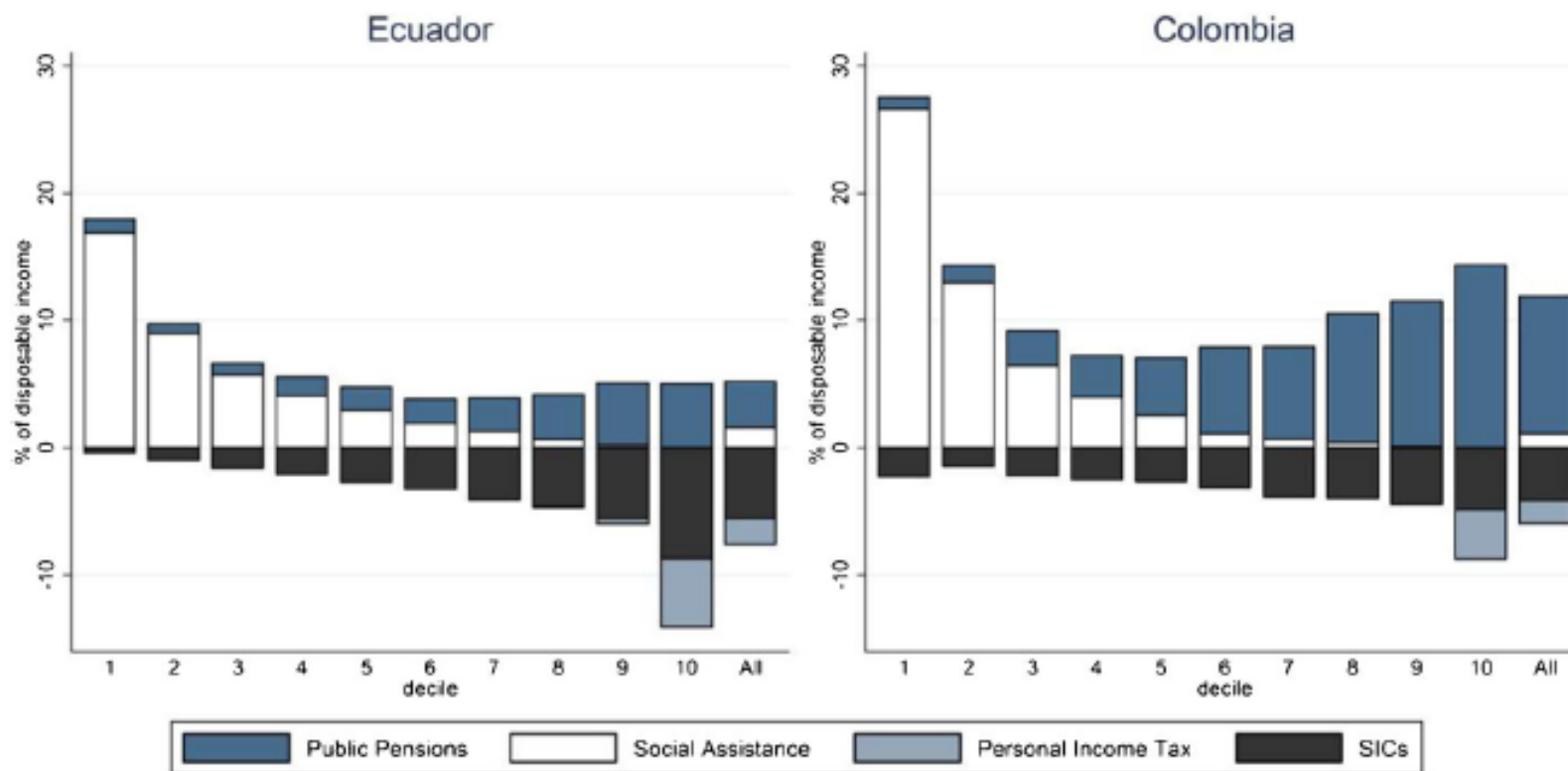# Thank you!

Relative size of tax-benefit components

Fig. 1 Tax-benefit components as a share of household disposable income (2014) Source: ECUAMOD version 1.0 and COLMOD version 1.0