CEQ INSTITUTE
COMMITMENT TO EQUITY
Tulane University

Commitment to Equity (CEQ): Introduction, Recent Innovations, and the CEQ Stata Package

Sean Higgins
Co-Director of Data Center and Software Development, CEQ Institute
Post-Doctoral Fellow, UC Berkeley

Poverty Global Practice Summer School
World Bank
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Agenda

- 9-9:20am Introduction to CEQ
- 9:20-10:45am What's New: Recent Innovations in CEQ
- 10:45-11am Coffee Break
- 11-12:30pm CEQ Stata Package

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Introduction to CEQ

CEQ Institute: Brief Description

Mission: The CEQ Institute works to reduce inequality and poverty through comprehensive and rigorous tax and benefit incidence analysis, and active engagement with the policy community

Objective: To measure the impact of fiscal policy on inequality and poverty across the world using a comparable framework

Workstreams:

- Research-based policy tools
- Data Center
- Advisory and training services
- Bridges to policy

➢ Grant from Bill & Melinda Gates Foundation US4.9 million for 5 years (2016 – 2020)

CEQ Workstreams: Tools

- **CEQ Handbook**

  Lustig, Nora, editor. 2017. *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty.* Brookings Institution and the CEQ Institute. (Online edition here.)

  1. **Methodology**
  2. **Implementation**
  3. **Applications**
  4. **Tools**

  - **CEQ Master Workbook**: Excel spreadsheet to present background information, assumptions and results.
  - **CEQ Checking Protocol**
  - **CEQ Stata Package**

CEQ Workstreams: Data Center

- Data on poverty and inequality across income concepts in 30 countries can be downloaded from our Data Center

Future of Data Center

- Expand indicators included in Data Center
- Expand country coverage
- Interactive graphs programmed using Tableau
- For countries in which it is possible:
  - Harmonized microdata
    - Common variable names across countries for income concepts, categories of fiscal intervention
    - Would allow cross-country research using rich microdata
  - Code used to convert raw microdata to harmonized and produce CEQ Assessment
    - Allows others to test impact of changes to assumptions
    - Research Transparency: allows replication of results

CEQ Workstreams: Advisory and Training

- Events like this
  - This mini-training offered at no cost to World Bank as part of CEQ-World Bank agreement in process of being signed
- 2-3 day trainings at World Bank: Feb 2015, Feb 2016, Jul 2016
  - Attended by Bank staff and governments (Indonesia Ministry of Finance, South Africa Treasury)
- Trainings at:
  - Ghana, Paraguay, Timor Leste Ministries of Finance
  - Inter-American Development Bank
  - European Commission
  - World Bank country offices in Dominican Republic and Senegal
    - Participation of Ministry of Finance, Central Bank, Ministry of Development, National Statiscs Office

CEQ Workstreams: Bridges to Policy

- Research collaborations with ADB, AfDB, CAF, IDB, IMF, ICEFI, OECD, Oxfam, UNDP, UNICEF, World Bank
- Agreements and partnerships with OAS, CGD
- Director Nora Lustig participation in:
  - G20 Group on Global Financial Governance
  - World Bank Commission on Global Poverty
- With IMF: Article IV and IMF program reviews
  - Completed for Costa Rica, Guatemala, Togo, Zambia
  - In progress for Nigeria and Swaziland
  - Soon to begin: Benin, Tajikistan

CEQ Assessments

- Working on over 40 countries
  - Covers around two thirds of the world population
  - Results available online for 30 countries in our Data Center
- Nonresident Research Associates and over 100 collaborators
- Utilized by governments
- Working Paper series
- Numerous scholarly publications
  - Journal of Development Economics
  - World Development
  - etc.

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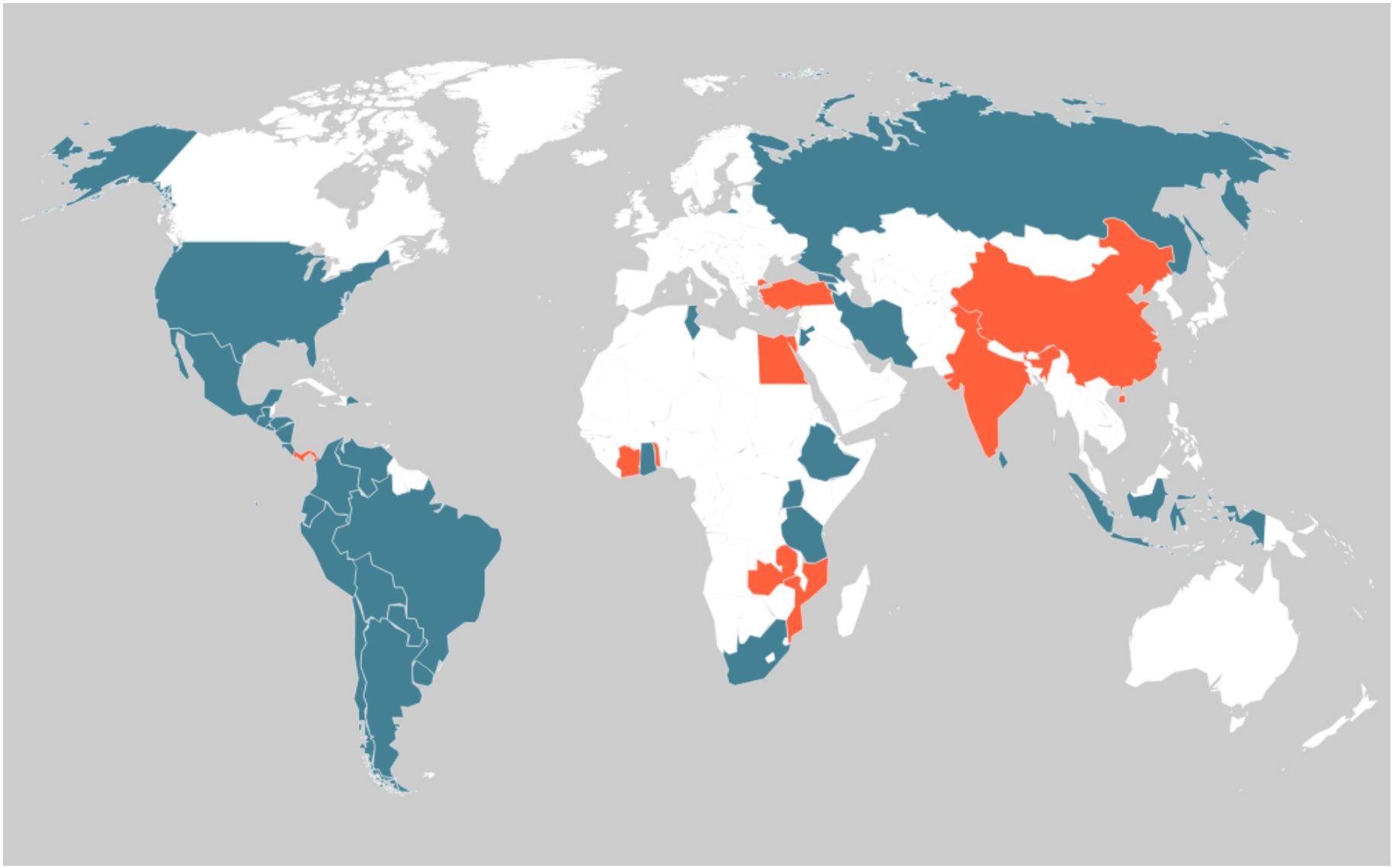
http://www.commitmentoequity.org/



CEQ-World Bank Partnership

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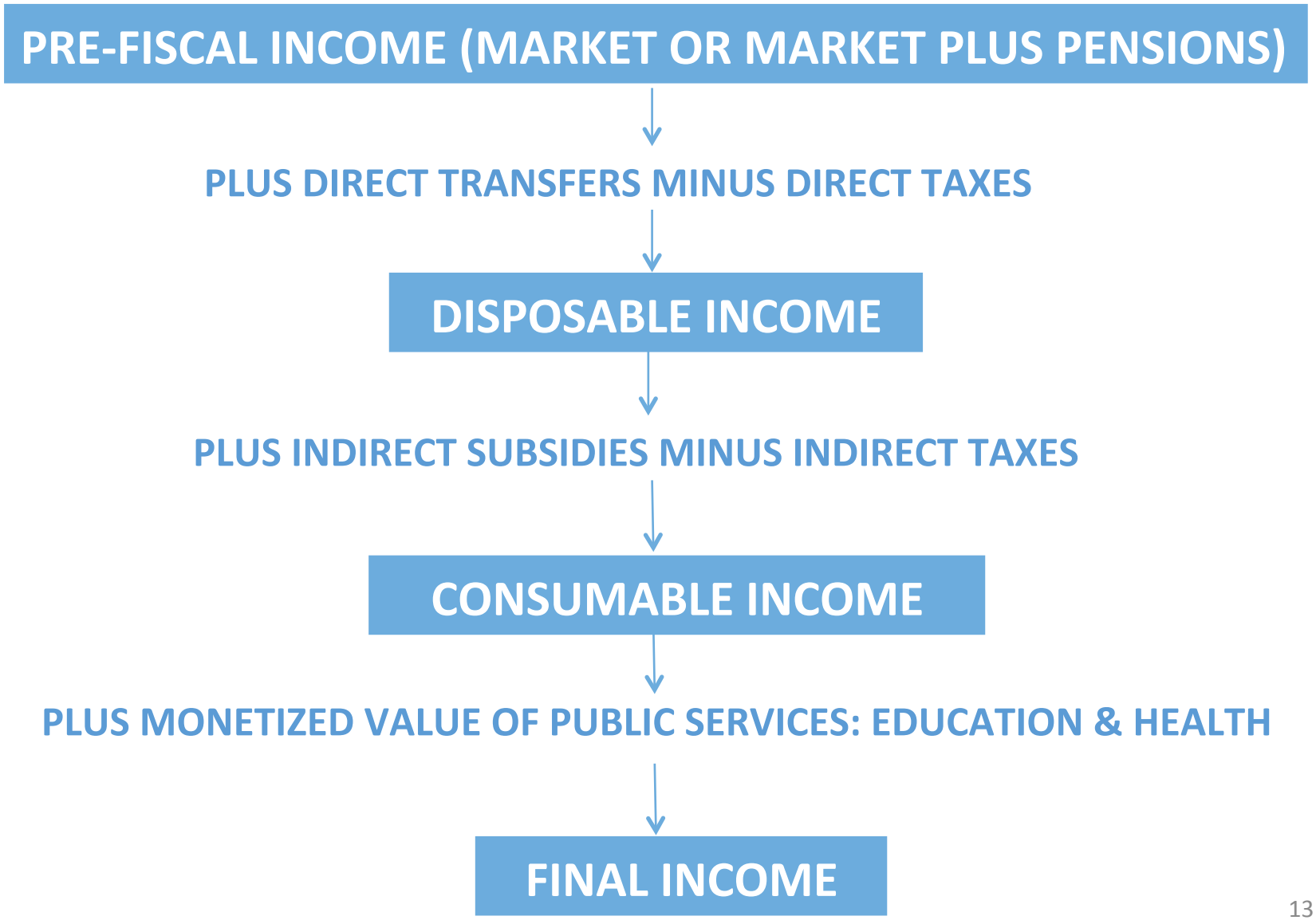
World Bank Studies using CEQ Methodology					
In partnership with CEQ Institute		**World Bank on its own**			
1	Armenia	1	Albania	16	Mexico* (second round)
2	Chile	2	Armenia (second round)	17	Mongolia
3	Dominican Republic	3	Bangladesh	18	Montenegro*
4	Ethiopia	4	Belarus	19	Mozambique*
5	Georgia	5	Brazil (second round)	20	Namibia*
6	Ghana	6	Cameroon	21	Pakistan
7	Indonesia	7	Colombia	22	Poland
8	Jordan	8	Comoros*	23	Republic of Congo
9	Paraguay	9	Croatia	24	Russia (second round)
10	Russia	10	Egypt*	25	Senegal*
11	South Africa	11	Gabon	26	Serbia
12	Sri Lanka	12	Greece	27	Sri Lanka (second round)
13	Tanzania	13	Indonesia* (second round)	28	Turkey
14	Zambia	14	Latvia	29	Vietnam*
		15	Mali		

Note: *In collaboration with CEQ Institute or with a CEQ Institute team member as consultant

Data, Information, and Software Requirements

- Household survey (representative at the national level, most recent available)
- Input-output table or Social Accounting Matrix (preferably of year close to household survey)
- Detailed description of each tax and spending item to be included in the analysis
- Budget & administrative data for the year of the survey
- Stata 13 or higher
  - Make sure to `update all`
  - To export *graphs* directly to Excel, Stata 14 or higher

CEQ Assessment: Income Concepts



CEQ Assessment: Fiscal Interventions

- Currently included:
  - Direct taxes
  - Direct cash transfers
  - Non-cash direct transfers such as school uniforms and school lunches
  - Contributions to pensions and social insurance systems
  - Indirect taxes on consumption
  - Indirect subsidies
  - In-kind transfers such as spending on education and health (valued at government cost)

Allocation Methods

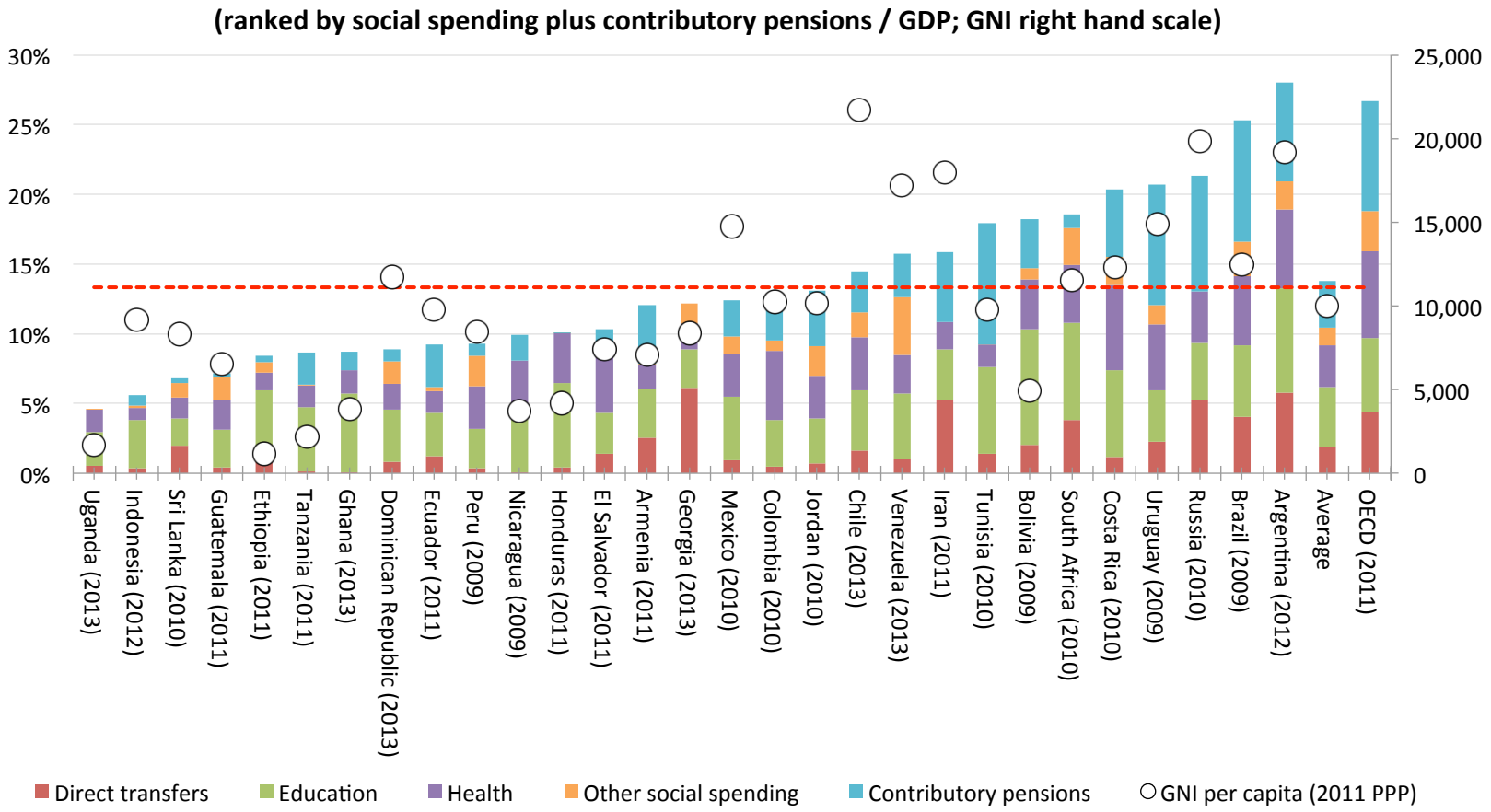
- Direct Identification from survey
  - However, results must be checked: how realistic are they?

- If information not directly available in microdata, then:
  - Inference
  - Imputation
  - Simulation
  - Prediction
  - Alternate Survey
  - Secondary Sources (last resort)

CEQ Assessment: Questions

- How much income redistribution and poverty reduction is being accomplished through fiscal policy?
- How equalizing and pro-poor are specific taxes and government spending?
- How effective are taxes and government spending in reducing inequality and poverty?
- What is the impact of fiscal reforms that change the size and/or progressivity of a particular tax or benefit?

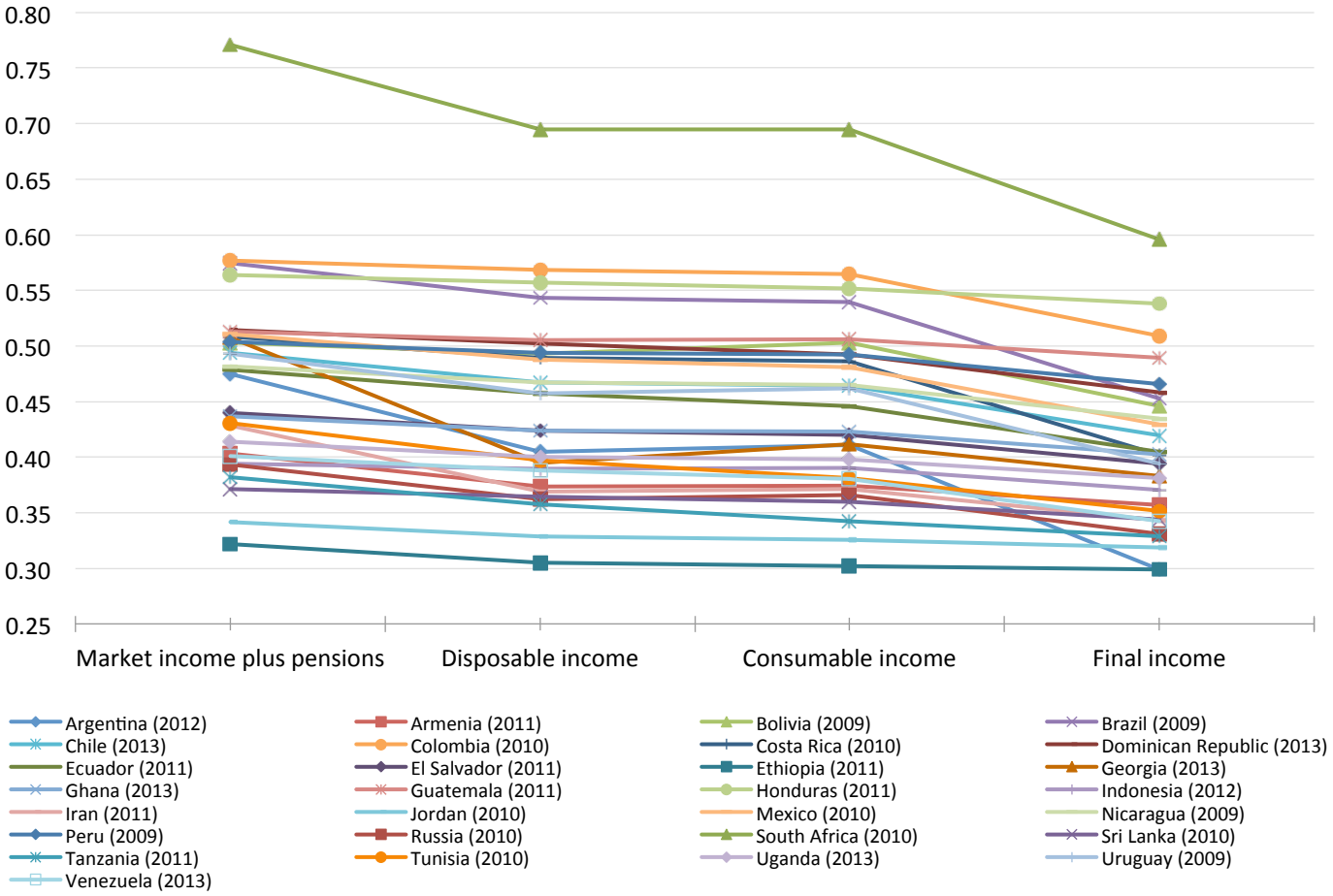
Composition of Social Spending as a Share of GDP (circa 2010)



Source: Lustig (2017)

Fiscal Policy and Inequality

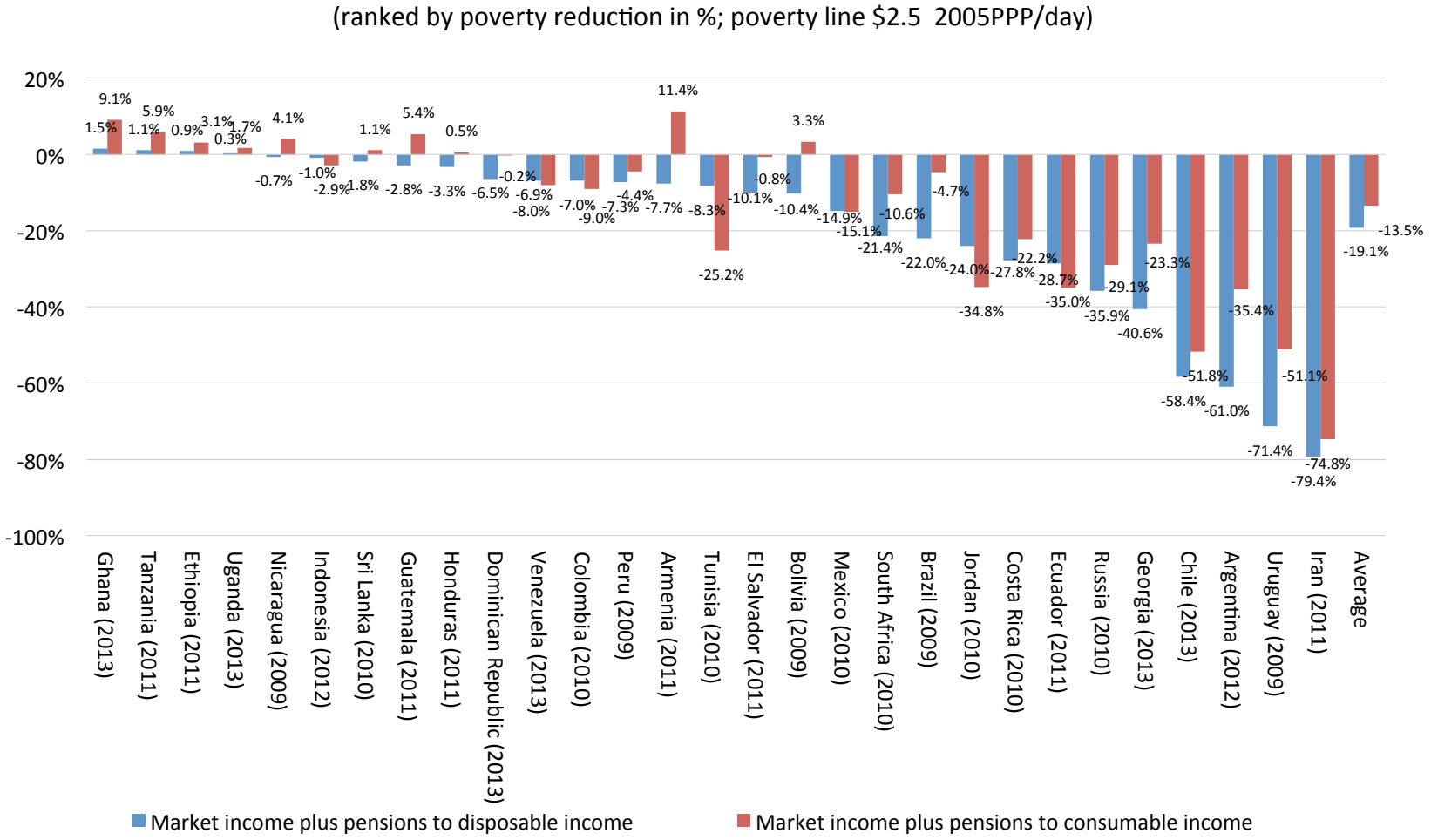
Contributory pensions as deferred income



Source: Lustig (2017)

Fiscal Policy and Poverty Reduction

Change in Headcount Ratio from Market Income plus Pensions to Consumable Income (Poverty line $2.5 2005 PPP/day); in % Contributory pensions as deferred income



Source: Lustig (2017)

What's New: Recent Innovations in CEQ

Outline of What's New in CEQ

- **Treatment of Contributory Social Insurance Pensions**
- Fiscal Impoverishment Indicators
- Effectiveness Indicators
- Valuing Health Benefits
- Valuing Education Benefits
- Underreporting and undercoverage of top incomes

Treatment of Contributory Social Insurance Pensions:

- Pensions as Deferred Income? (PDI)

- Pensions as Government Transfer? (PGT)

Source: Lustig and Higgins (2017)

Treatment of Contributory Social Insurance Pensions:

Two extreme scenarios:

- Deferred income in actuarially fair systems: pensions included in *pre-fiscal income* and contributions treated as mandatory savings
  - Hence, pre-fiscal income should be net of contributions
- Government transfer: pensions included among direct transfers and contributions treated as a direct tax
  - Hence, pre-fiscal income should be gross of contributions which are subtracted out before arriving at disposable income

Source: Lustig and Higgins (2017)

Contributory Pensions: Double Counting

- Pensions as deferred income
  - Factor income during working years = Y
  - Factor income during retirement years = 0
  - Contributions to pensions at rate s
  - Actuarially fair system: receive pensions = sY in retirement (for simplicity zero interest)
  - Total direct taxes = T and benefits = B
    - T', B' in retirement

	Factor income	Contributions	Pre-fiscal Income	Disposable Income
Working age	Y	sY	**Y or (1-s)Y?**	
Retirement age	0	0	sY	

Source: Lustig and Higgins (2017)

Contributory Pensions: Double Counting

- Pensions as deferred income
  - Factor income during working years = Y
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  - Contributions to pensions at rate s
  - Actuarially fair system: receive pensions = sY in retirement (for simplicity zero interest)
  - Total direct taxes = T and benefits = B
    - T', B' in retirement

	Factor income	Contributions	Pre-fiscal Income	Disposable Income
Working age	Y	sY	(1-s)Y	(1-s)Y – T + B
Retirement age	0	0	sY	sY – T' + B'

Source: Lustig and Higgins (2017)

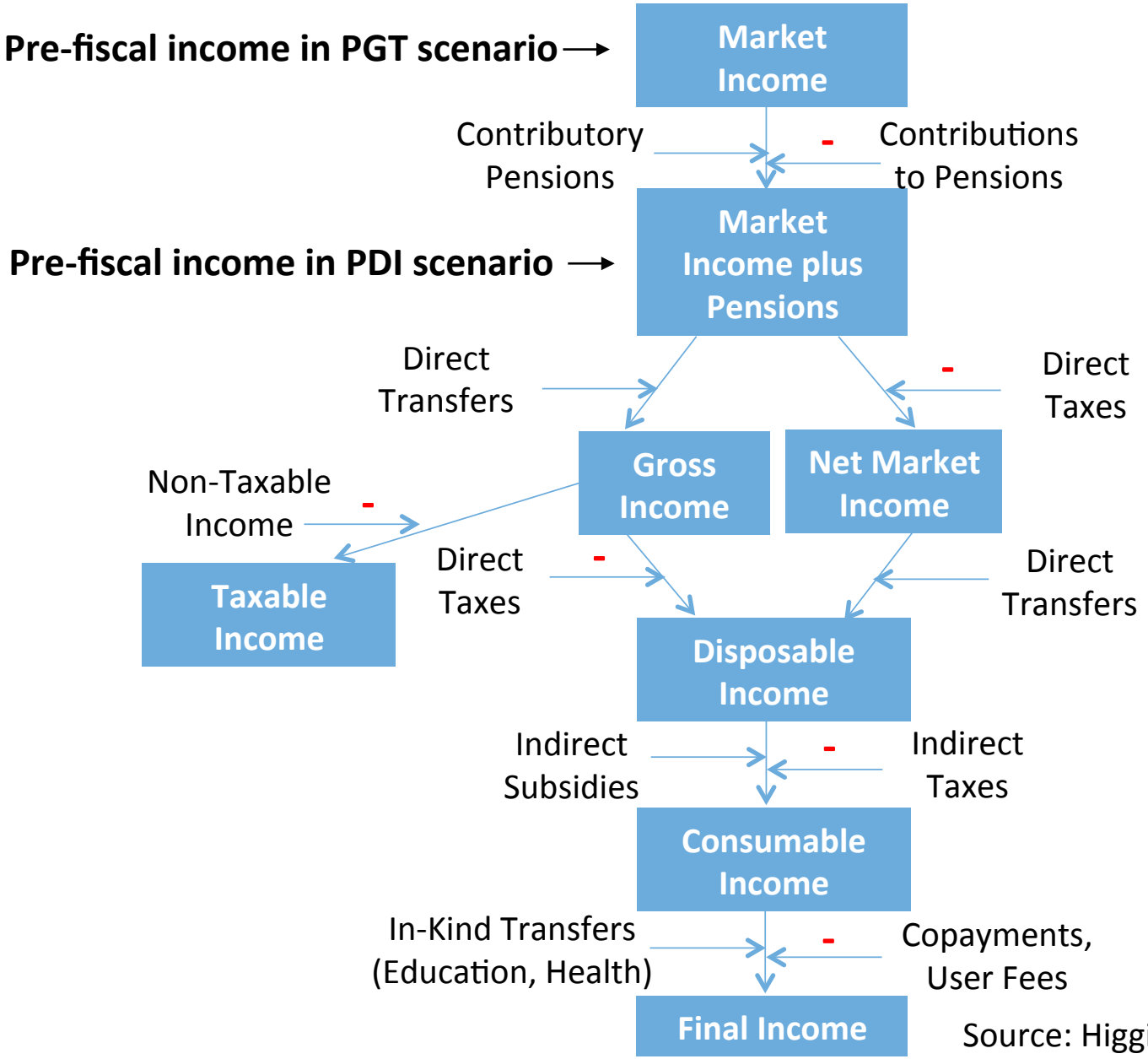
Contributory Pensions: Double Counting

- So in PDI scenario:
  - Pre-fiscal income is **market income PLUS pensions**
  - Market income PLUS pensions is net of contributions
- Pensions as government transfer
  - Contributions not subtracted out of pre-fiscal income
  - Subtracted when moving to disposable (like a tax)
  - Pre-fiscal income for retirement age is 0
  - For retired, pension added when moving to disposable income
  - Note disposable income is the same in both scenarios

	Factor income	Contributions	Pre-fiscal income	Disposable Income
Working age	Y	sY (treat as tax)	Y	(1-s)Y – T + B
Retirement age	0	0	0	sY – T' + B'

Source: Lustig and Higgins (2017)

Constructing Income Concepts



Source: Higgins and Lustig (2017)

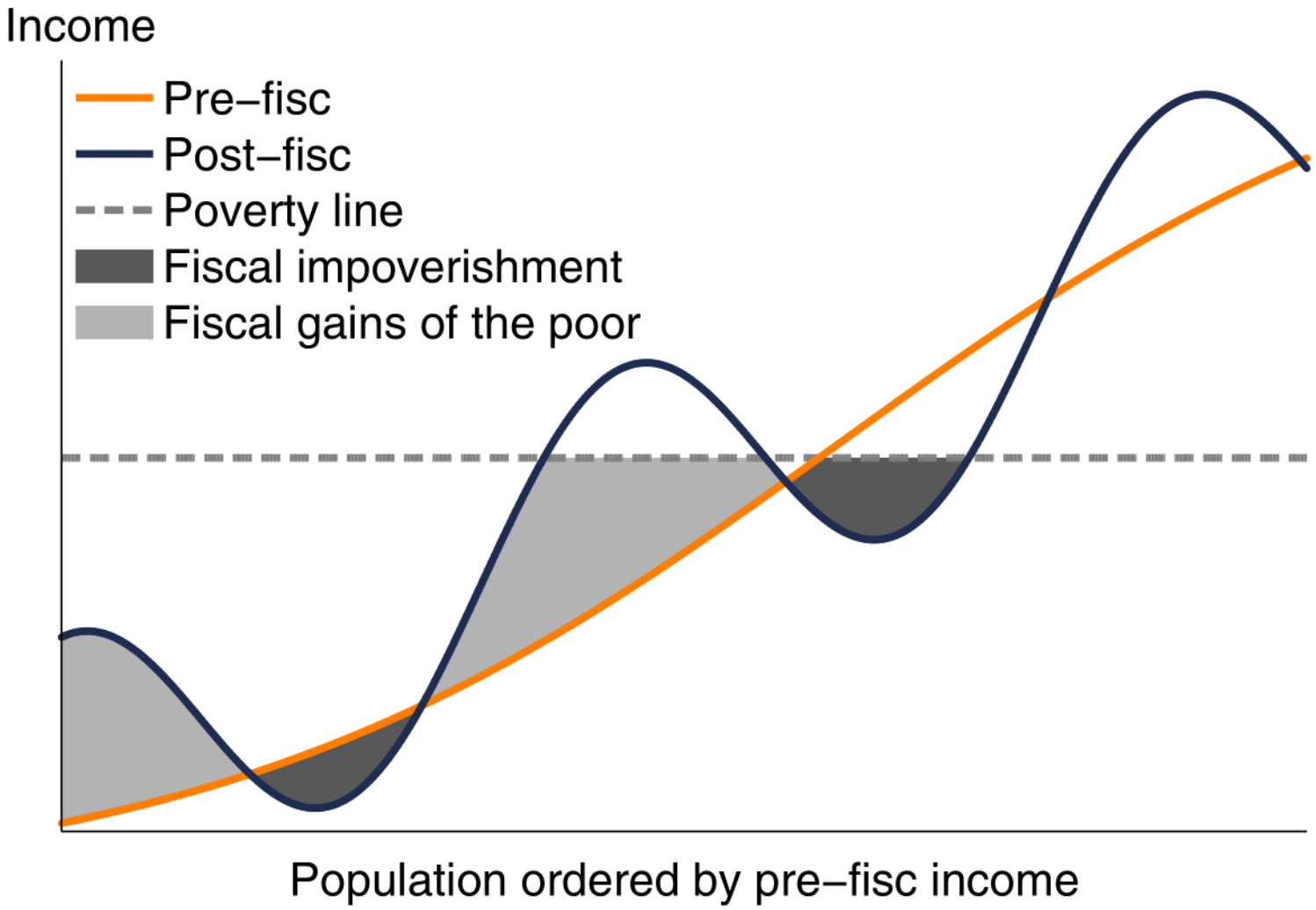
Outline of What's New in CEQ

- Treatment of Contributory Social Insurance Pensions
- **Fiscal Impoverishment Indicators**
- Effectiveness Indicators
- Valuing Health Benefits
- Valuing Education Benefits
- Underreporting and undercoverage of top incomes

Fiscal Impoverishment

- **The issue:** Analyzing the impact on poverty and inequality indicators can be misleading
  - Fiscal systems can show an unambiguous reduction in poverty and inequality, and yet a substantial share of the poor could have been impoverished by the combined effect of taxes and transfers

Source: Higgins and Lustig (2016)



Source: Higgins and Lustig (2016)

Fiscal Impoverishment
(Market Income plus Pensions to Consumable Income)

Country (survey year)	Market income plus pensions Poverty headcount (%)	Change in poverty headcount (p.p.)	Market income plus pensions inequality (Gini)	Reynolds-Smolensky	Change in inequality (▲Gini)	Fiscally impoverished as % of population	Fiscally Impoverished as % of consumable income poor
Panel A: Upper-middle income countries, using a poverty line of $2.5 2005 PPP per day							
Brazil (2009)	16.8	-0.8	57.5	4.6	-3.5	5.6	34.9
Chile (2013)	2.8	-1.4	49.4	3.2	-3.0	0.3	19.2
Ecuador (2011)	10.8	-3.8	47.8	3.5	-3.3	0.2	3.2
Mexico (2012)	13.3	-1.2	54.4	3.8	-2.5	4.0	32.7
Peru (2011)	13.8	-0.2	45.9	0.9	-0.8	3.2	23.8
Russia (2010)	4.3	-1.3	39.7	3.9	-2.6	1.1	34.4
South Africa (2010)	49.3	-5.2	77.1	8.3	-7.7	5.9	13.3
Tunisia (2010)	7.8	-0.1	44.7	8.0	-6.9	3.0	38.5

Source: Higgins and Lustig (2016)

Fiscal Impoverishment
(Market Income plus Pensions to Consumable Income)

Country (survey year)	Market income plus pensions Poverty headcount (%)	Change in poverty headcount (p.p.)	Market income plus pensions inequality (Gini)	Reynolds-Smolensky	Change in inequality (▲Gini)	Fiscally Impoverished as % of population	Fiscally Impoverished as % of consumable income poor
Panel B: Lower-middle income countries, using a poverty line of $1.25 2005 PPP per day							
Armenia (2011)	21.4	-9.6	47.4	12.9	-9.3	6.2	52.3
Bolivia (2009)	10.9	-0.5	50.3	0.6	-0.3	6.6	63.2
Dominican Republic (2013)	6.8	-0.9	50.2	2.2	-2.2	1.0	16.3
El Salvador (2011)	4.3	-0.7	44.0	2.2	-2.1	1.0	27.0
Guatemala (2010)	12.0	-0.8	49.0	1.4	-1.2	7.0	62.2
Indonesia (2012)	12.0	-1.5	39.8	1.1	-0.8	4.1	39.2
Sri Lanka (2010)	5.0	-0.7	37.1	1.3	-1.1	1.6	36.4

Source: Higgins and Lustig (2016)

Fiscal Impoverishment: Axiomatic Measure

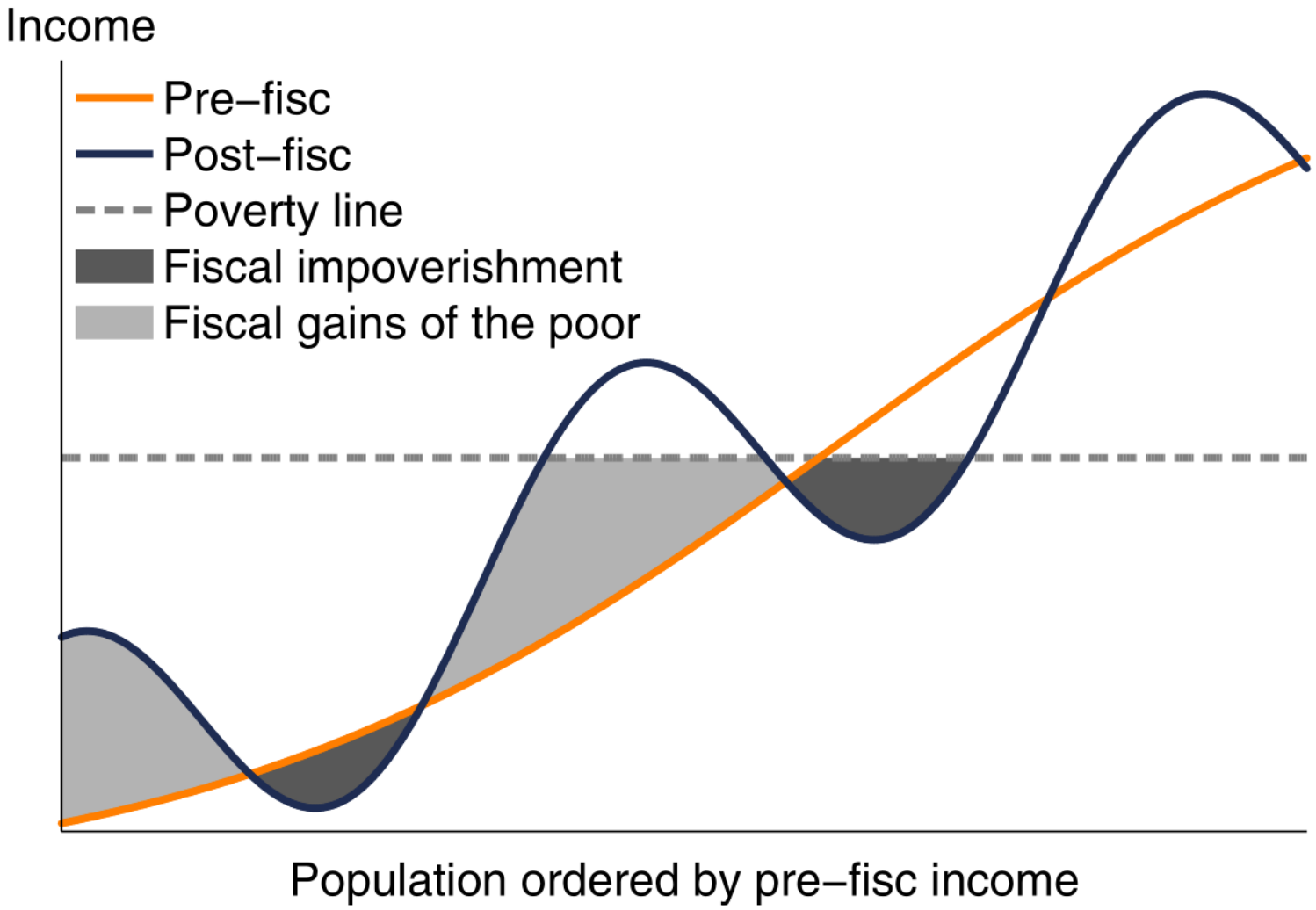
- The % fiscally impoverished showed earlier violates certain axioms
- Axioms:
  - FI Monotonicity
  - Focus
  - Normalization
  - Continuity
  - Permutability
  - Translation invariance
  - Linear homogeneity
  - Subgroup consistency

Fiscal Impoverishment: Axiomatic Measure

- A measure satisfying these axioms is uniquely determined up to a proportional transformation

$$f(y^0, y^1; z) = k \sum_{i=1}^{n} \left(\min\{y_i^0, z\} - \min\{y_i^0, y_i^1, z\} \right)$$

- Pre-fisc poor and impoverished ($y_i^1 < y_i^0 < z$) contributes fall in income, $y_i^0 - y_i^1$
- Pre-fisc non-poor and impoverished ($y_i^1 < z \leq y_i^0$) contributes amount to transfer her back to poverty line, $z - y_i^1$
- Non-impoverished pre-fisc non-poor ($y_i^0 \geq z$ and $y_i^1 \geq z$) contributes $z - z = 0$
- Non-impoverished pre-fisc poor ($y_i^0 < z$ and $y_i^1 \geq y_i^0$) contributes $y_i^0 - y_i^0 = 0$



Source: Higgins and Lustig (2016)

Fiscal Impoverishment: Axiomatic Measure

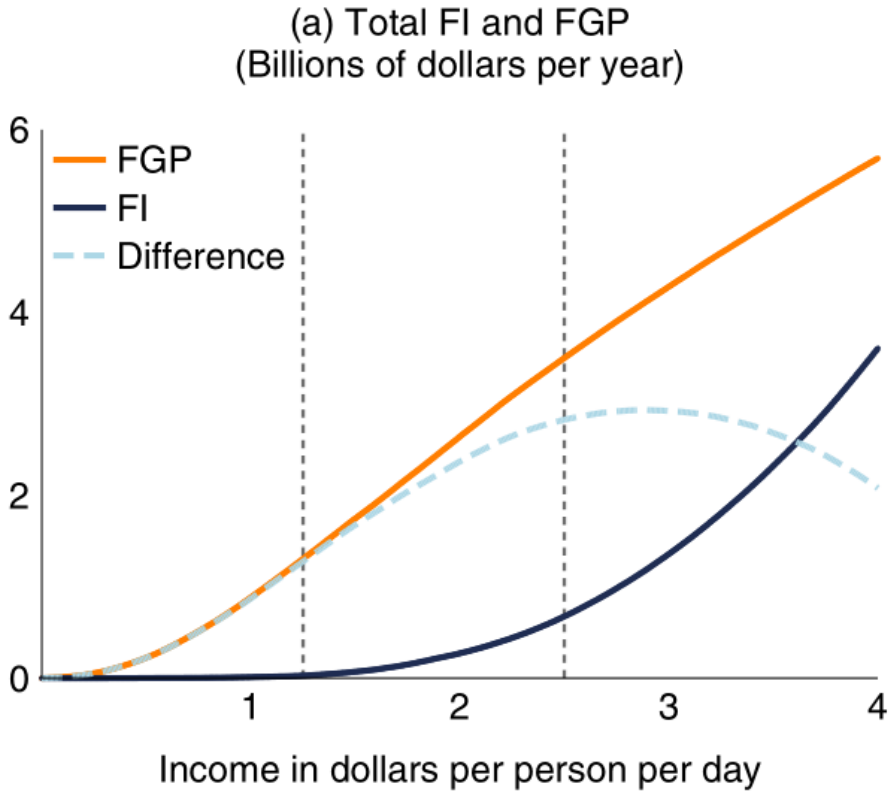
- With analogous axioms for gains of the poor:

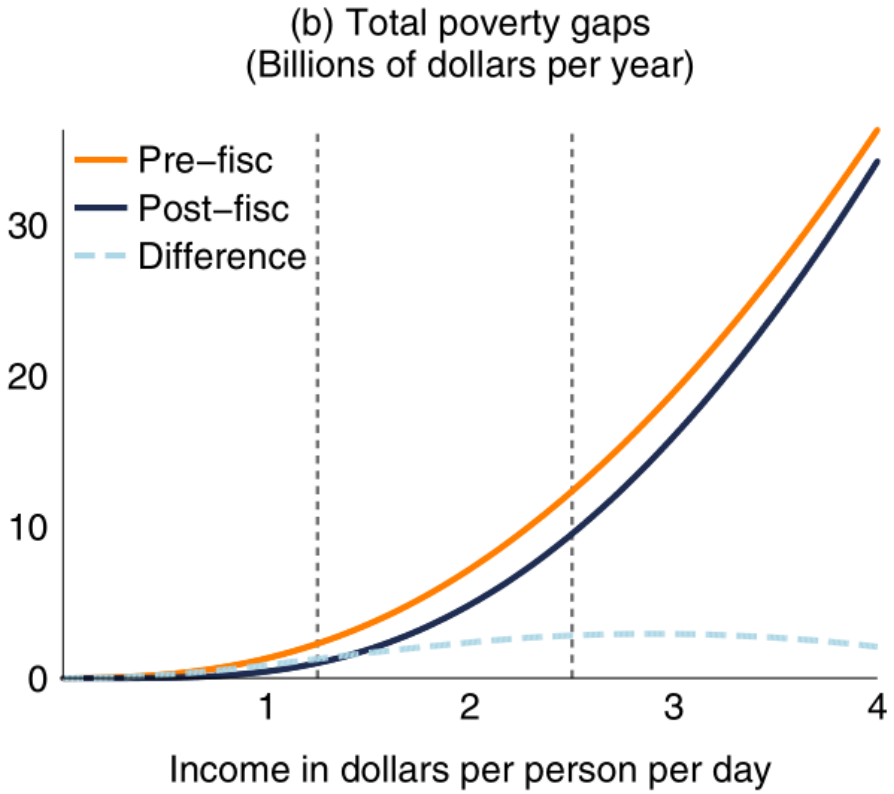
$$g(y^0, y^1; z) = k \sum_{i=1}^{n} \left(\min\{y_i^1, z\} - \min\{y_i^0, y_i^1, z\} \right)$$

- Poverty gap can be decomposed into fiscal impoverishment minus gains
  - Poverty gap $p(y; z) = v(n, z) \sum_{i=1}^{n} (z - y_i) \mathbb{I}(y_i < z)$
    - $v(n, z) = 1$ gives total poverty gap
    - $v(n, z) = \frac{1}{zn}$ gives poverty gap ratio

$$p(y^1; z) - p(y^0; z) = \frac{v}{k} \left[f(y^1, y^0; z) - g(y^1, y^0; z) \right]$$

Poverty Gap Decomposition: Brazil





Fiscal Impoverishment: Policy Lessons

- In 10 of 15 countries, between one-quarter and two-thirds of the post-fisc poor lost income to the fiscal system.
- In five countries, between 25 and 50% are still fiscally impoverished even when the monetized value of education and health services are included as transfers
- Extreme care must be taken with emphasizing domestic resource mobilization to achieve SDGs
- Must assess the impact on fiscal impoverishment of tax and subsidy reforms
  - Otherwise one may not realize hurting a substantial number of poor
- Impact on the poor of increasing taxes requires the use of adequate indicators
  - Conventional measures of inequality and poverty can be *awfully* misleading

Source: Higgins and Lustig (2016)

Outline of What's New in CEQ

- Treatment of Contributory Social Insurance Pensions
- Fiscal Impoverishment Indicators
- **Effectiveness Indicators**
- Valuing Health Benefits
- Valuing Education Benefits
- Underreporting and undercoverage of top incomes

Effectiveness

- An indicator that you typically would think of:

$$\Delta Gini/Spending$$

Problem:

- Fiscal interventions of larger size could be ranked worse just because higher spending may result in incrementally lower declines in Gini
  - Decreasing marginal returns to spending for non-linear measures like Gini, squared poverty gap
  - Leads to improper ranking of fiscal interventions

Source: Enami (2017)

Effectiveness

Additional problems with

$$\Delta Gini/Spending$$

- Not "unit-free" which is usually desirable for indices
  - Measured in Gini points per $ spent
  - Our old CEQ Effectiveness Indicator $\Delta Gini/Spending/GDP$ is unit free but still has same other issues and can be below or above 1; hard to interpret
- Not normalized
  - Normalization axiom: should = 1 when a program reaches its maximum efficiency

Source: Enami (2017)

Effectiveness

Desirable properties:

- Ranks interventions properly
- Normalization
  - Be within a certain range (i.e., between 0 and 1, or between -1 and 1)
  - Equals 1 when program reaches maximum efficiency
- Intuitively appealing interpretation

Source: Enami (2017)

Reminder: How to Calculate the Marginal Contribution

- Let's use an example: *Marginal Contribution of Direct Taxes to the inequality of Disposable Income*

$$\textit{Market Income} - \textit{Direct Taxes} + \textit{Direct Transfers} = \textit{Disposbale Income}$$

- Two important Income concepts:
  - "Before": Disposable Income without (before subtracting out) Direct Taxes
    - *Market Income + Direct Transfers,* or
    - *Disposable Income + Direct Taxes.*
  - "After": Disposable Income
- Marginal Contribution of the Direct Taxes:

$$MC\downarrow \textit{Direct Taxes}\uparrow \textit{Disposable Income} = \textit{Gini}\downarrow \textit{Disposable Income} \setminus \textit{Direct Taxes} - \textit{Gini}\downarrow \textit{Disposable Income}$$

- Direct Taxes are equalizing if $MC\downarrow \textit{Direct Taxes}\uparrow \textit{Disposable Income} > 0$

Source: Enami (2017)

CEQ Effectiveness Indicators

- General Indicators:
  1. **Impact Effectiveness**
  2. **Spending Effectiveness**

- Poverty-Specific Indicators:
  3. **Fiscal Impoverishment and Gains Effectiveness**

1. Impact Effectiveness

- For Inequality Indices (e.g. Gini):

$$Impact\ Effectiveness{\downarrow}T\ (and/or\ B){\uparrow}End\ income = MC{\downarrow}T\ (and/or\ B){\uparrow}End\ income\ /MC{\downarrow}T\ (and/or\ B){\uparrow}End\ income\ {\uparrow}*\ ,$$

where $MC{\downarrow}T\ (and/or\ B){\uparrow}End\ income\ {\uparrow}*$ is the maximum possible $MC{\downarrow}T\ (and/or\ B){\uparrow}End\ income$

- If the same amount of T is taxed optimally to reduce inequality
  - To achieve maximum: tax richest until income equal to second-richest, tax both until income equal to third-richest, etc.
- Or same amount of B is taxed optimally to reduce inequality
  - To achieve maximum: give to poorest until income equal to second-poorest, give to both until income equal to third-poorest, etc.

Source: Enami (2017)

1. Impact Effectiveness

- For Poverty Indices (e.g. Poverty headcount ratio):
  - **Transfers:** Same formula as for inequality.
  - **Taxes** can only increase poverty. New definition:

$$Poverty\ Impact\ Effectiveness_{\downarrow T \uparrow End\ income} = -MC_{\downarrow T \uparrow End\ income} \ / \ MC_{\downarrow T \uparrow End\ income \uparrow H}$$

where $MC_{\downarrow T \uparrow End\ income \uparrow H}$ is the Marginal Contribution of a tax if it is redistributed in the worst possible way.

  - Worst possible way means tax the poorest until income = 0, then tax second poorest until income = 0, etc.
  - So it captures how badly the poverty-increasing tax does relative to the amount of harm it could potentially do

Source: Enami (2017)

1. Impact Effectiveness

- This Indicator is always between -1 and +1 and the higher its value, the better it is.
- Interpretation: Given the amount we spent (or taxed), we achieved X% of the inequality (or poverty) reduction that was possible
  - "Relative realized inequality or poverty reduction of a tax, a transfer or a combination of taxes and transfers"
  - Example: inequality impact effectiveness of a transfer = 0.7 → the transfer has realized 70% of its potential to reduce inequality
- In the context of poverty and only for the taxes: how much of the tax's potential to harm the poor was realized? (More negative → more potential for harm realized)

Source: Enami (2017)

1. Impact Effectiveness (Application: Iran)

Fiscal Incident		Impact Effectiveness with respect to:		
		Disposable Income	Consumable Income	Final Income
Direct Taxes and Contributions	Income Tax	0.3287	0.3547	0.4048
	Employee contributions to the health insurance	0.0838	0.0789	0.1246
	Employer contributions to the health insurance	0.2214	0.2267	0.2383
	Employee contributions to the Social Security	0.1479	0.1195	0.1718
	Employer contributions to the Social Security	0.3178	0.3354	0.3056
	Total Direct Taxes and Contributions	**0.2571**	**0.2540**	**0.2871**
Direct Transfers	Targeted Subsidy Program	0.3867	0.3932	0.3840
	Social Assistance	0.4250	0.4369	0.4490
	Semi-cash Transfers (Food)	-0.0217	-0.0245	-0.0320
	Total Direct Transfers	**0.4195**	**0.4236**	**0.4112**
Indirect Taxes (Sales Taxes)		-	**-0.1395**	**-0.1303**
In-kind Transfers	Education Transfers	-	-	0.2327
	Education User-fees	-	-	0.1630
	Health Transfers	-	-	0.3284
	Health User-fees	-	-	-0.2490

Note: The Gini coefficient is the index used to calculate the effectiveness indicator here.

Source: Enami (2017)

2. Spending Effectiveness

- It is only applicable to the taxes and transfers with <u>positive</u> Marginal Contribution (inequality or poverty reducing)

$$Spending\ Effectiveness \downarrow T\ (and/or\ B) \uparrow End\ income = T\uparrow *\ (and/or\ B\uparrow *)/T\ (and/or\ B)$$

where $T\uparrow *\ (and/or\ B\uparrow *)$ is the minimum amount of Tax (or Benefit) that is needed to create the same $MC \downarrow T\ (and/or\ B) \uparrow End\ income$

- This Indicator is always between 0 and +1 and the higher its value, the better it is.

Source: Enami (2017)

2. Spending Effectiveness (Application: Iran)

Fiscal Incident		Spending Effectiveness with respect to:		
		Disposable Income	**Consumable Income**	**Final Income**
Direct Taxes and Contributions	Income Tax	0.3693	0.3709	0.3918
	Employee contributions to the health insurance	0	0	0
	Employer contributions to the health insurance	0.1855	0.1872	0.2223
	Employee contributions to the Social Security	0.1237	0.1211	0.1392
	Employer contributions to the Social Security	0.2843	0.2825	0.2932
	Total Direct Taxes and Contributions	**0.2475**	**0.2439**	**0.2633**
Direct Transfers	Targeted Subsidy Program	0.2863	0.2887	0.2675
	Social Assistance	0.4147	0.4199	0.4132
	Semi-cash Transfers (Food)	N/A	N/A	N/A
	Total Direct Transfers	**0.2966**	**0.2993**	**0.2784**
Indirect Taxes (Sales Taxes)		**-**	**N/A**	**N/A**
In-kind Transfers	Education Transfers	-	-	0.1761
	Education User-fees	-	-	0.1413
	Health Transfers	-	-	0.2722
	Health User-fees	-	-	N/A

Source: Enami (2017)

3. Fiscal Impoverishment and Gains Effectiveness

- It is only applicable to the poverty indicators.

- It uses two concepts introduced in Higgins and Lustig (2016):
  - **Fiscal Impoverishment (FI):** How much poor individuals are made worse off by a fiscal system.
  - **Fiscal Gains to the Poor (FGP):** How much poor individuals are made better off by a fiscal system.

Higgins, Sean, and Nora Lustig. 2016. "Can a poverty-reducing and progressive tax and transfer system hurt the poor?" *Journal of Development Economics* 122: 63-75.

3. Fiscal Impoverishment and Gains Effectiveness

- For a fiscal system (composed of taxes and transfers):

$$Effectiveness{\downarrow}FI/FGP = [(B/T+B)(FGP\_MC{\downarrow}T \text{ and } B{\uparrow}End\ income/B)] + [(T/T+B)(1-FI\_MC{\downarrow}T \text{ and } B{\uparrow}End\ income/T)]$$

where:

- B > 0 is total transfers, T > 0 is total taxes
- $FGP\_MC{\downarrow}T \text{ and } B{\uparrow}End\ income \geq 0$ is the marginal contribution of T and B to FGP
- $FI\_MC{\downarrow}T \text{and } B{\uparrow}End\ income \geq 0$ is the marginal contribution of T and B to FI

- This is a weighted average of :

$$Tax\ Effectiveness{\downarrow}FI = 1 - FI\_MC{\downarrow}T{\uparrow}End\ income/T,$$

$$Transfer\ Effectiveness{\downarrow}FGP = FGP\_MC{\downarrow}B{\uparrow}End\ income/B$$

Source: Enami, Higgins, and Younger (2017)

Outline of What's New in CEQ

- Treatment of Contributory Social Insurance Pensions
- Fiscal Impoverishment Indicators
- Effectiveness Indicators
- **Valuing Health Benefits**
- Valuing Education Benefits
- Underreporting and undercoverage of top incomes

Valuing Health Benefits

- We follow so-called "expenditure incidence" or the "government cost-of-provision" approach
- Per beneficiary input costs obtained from administrative data as the measure of average benefits
  - As disaggregated as possible
  - E.g. by type of care and by state
- This approach amounts to asking the following question:

  How much would the income of a household have to be increased if it had to pay for the free or subsidized public service at its full cost to the government?

Valuing Health Benefits

- **Issue:** welfare impact could be very different than amount spent
  - For example: low-cost preventative care (e.g. oral rehydration therapy, vaccination) can have large health impacts
- Alternative: Behavioral-outcome approach
  - Accounts for behavioral change and relies on outcomes to measure welfare
- Ongoing work by Jeremy Barofsky
- Strategy: use natural experiments where public health insurance coverage was expanded to estimate effect of different health interventions on mortality
  - Then convert to $ using value of statistical life

Valuing Health Benefits

- Limitations of the behavioral-outcome approach
  - Necessary data and natural experiments to evaluate welfare impact not available in most countries
  - Relies on value of statistical life estimates

- Unlikely that these methods will replace government cost-of-provision approach in CEQ methodology
  - In ongoing work Jeremy Barofsky is comparing the results from this method to cost-of-provision
  - Can be added as robustness checks when possible

Outline of What's New in CEQ

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Valuing Education Benefits

- Same as health: "government cost-of-provision" approach
  - As disaggregated as possible
  - E.g. by level of schooling and by state
- **Issue:** welfare impact could be very different than amount spent
  - Net present value of education benefits over lifetime
- Other possibilities to determine benefit of public education
  - Mincer regressions – but many reasons this might not estimate private rate of return (Heckman et al 2006)

Valuing Education Benefits

- Ongoing work by Sergio Urzua
- Estimate internal rates of return by modeling decision of whether to pursue next level of education
- Drawbacks to this approach:
  - Leads to estimates of differences in return across levels, not an absolute level of the return
- Like new health methods, unlikely to replace government cost-of-provision approach in CEQ methodology
  - Amounts can be compared to current methodology
  - Can be added as robustness checks when possible

Outline of What's New in CEQ

- Treatment of Contributory Social Insurance Pensions
- Fiscal Impoverishment Indicators
- Effectiveness Indicators
- Valuing Health Benefits
- Valuing Education Benefits
- **Underreporting and undercoverage of top incomes**

Underreporting and Undercoverage at Top

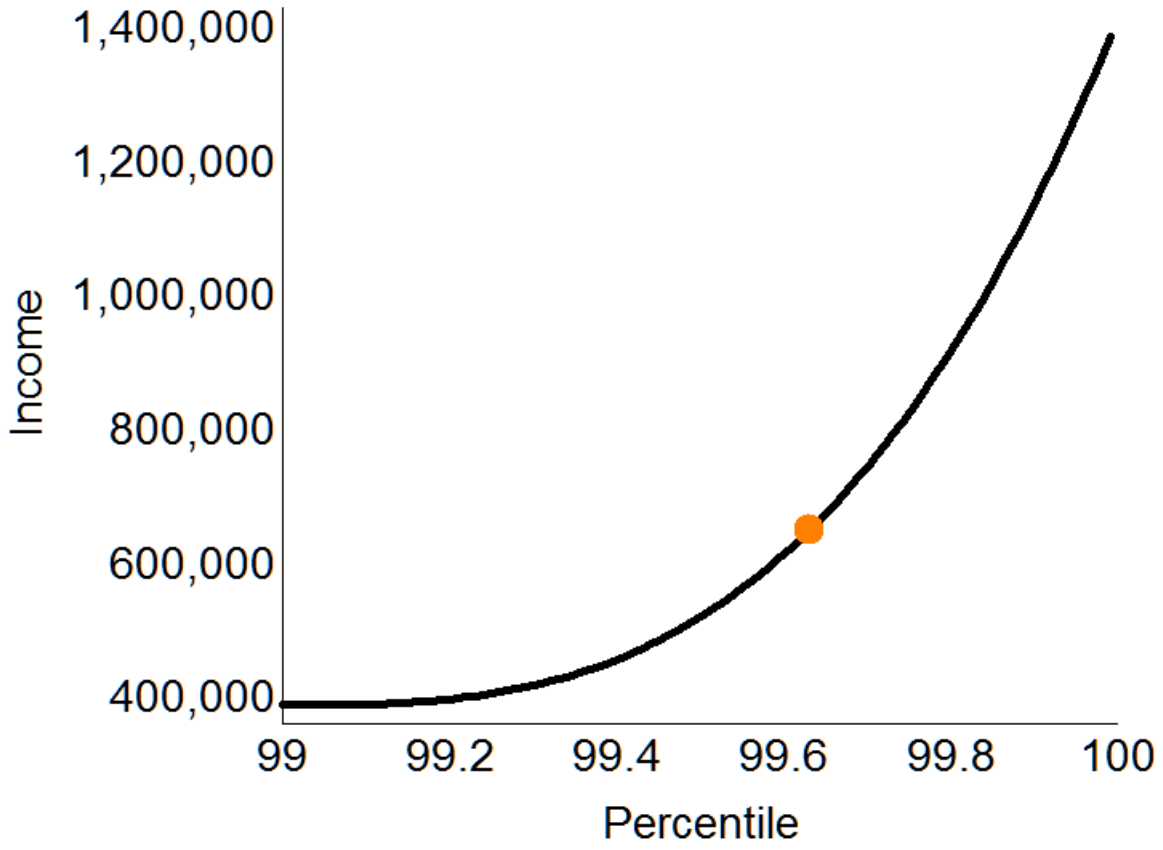
- **Issue:** multiple issues lead to bias in inequality estimates
  1. Underreporting of incomes
     - Can happen anywhere in the distribution
       - Don't know direction of bias on inequality estimate
  2. Unit non-response
     - Rich are less likely to respond to survey
     - Counter-intuitive: not necessarily true that this → inequality is underestimated (Deaton, 2005)
       - A "missing rich" person, once added back into survey, affects both relative distribution and mean income
       - Gini is function of both
     - In practice, this problem has led to underestimation of inequality (e.g. Hlasny and Verme, forthcoming)

Underreporting and Undercoverage at Top

- **Issue:** multiple issues lead to bias in inequality estimates
  3. Extreme observations
     - Even in absence of underreporting or higher probability of unit non-response from rich
     - Incomes of the rich are sparse (long tail of distribution)
     - Suppose our survey samples 1% of population, evenly distributed throughout distribution
     - We will sample 1 of richest 100 people
     - Assuming Pen parade is convex at upper tail of distribution:
       - In expectation, we get the right income for richest 100
       - More likely to underestimate than overestimate
       - But if we overestimate, expected to do so by more than if we underestimate

Underreporting and Undercoverage at Top

- **Issue:** multiple issues lead to bias in inequality estimates
  3. Extreme observations



Underreporting and Undercoverage at Top

- Potential solutions
  - Reweight or adjust incomes
  - Parametric correction to top incomes (e.g. fit a Pareto to upper tail of distribution)
  - Use tax record tabulation; cell-based imputations
- Drawbacks of these:
  - Based on assumptions we haven't had the data to test
  - We don't know which of the three issues described before is more prevalent
- Ongoing work by Facundo Alvaredo, Mauricio De Rosa, Sean Higgins, Nora Lustig, Andrea Vigorito
- Merge individual-level survey and tax return data to quantify extent of each issue, test assumptions and solutions

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CEQ Stata Package

Outline of CEQ Stata Package

- **Getting started and resources**
- Treatment of Contributory Social Insurance Pensions with CEQ Stata commands
- Newest commands
- Commands to run first; check basic results
- Commands for more advanced tasks
- Ongoing work: standalone commands for CEQ indicators (fiscal impoverishment, effectiveness)

CEQ Stata Package: Getting started

- Make sure have Stata 13 or newer
  - To export *graphs* (`ceqgraph` commands) directly to MWB, need Stata 14 or newer
- To install or update the CEQ Stata Package:

```
update all
ssc install ceq, replace
```

- Include the above in your do files that use CEQ Stata commands
  - This ensures always using most recent version of commands
- Read the resources (next slide)

CEQ Stata Package: Resources

- CEQ Handbook Chapter 7 (Higgins, 2017)
  - All the indicators used in the results in MWB Sections D and E
  - Commands and their syntax
- If analysis separated by group: Chapter 8 (Aranda and Ratzlaff, 2017)
- `help ceq` and help files for other commands
- If you get an error or have suggestions to improve the package email me at sean.higgins@ceqinstitute.org
- Always working on improving package
  - For example, thanks to Mata code for Ginis and concentration coefficients from Paul Corral, improved efficiency and runtimes of commands

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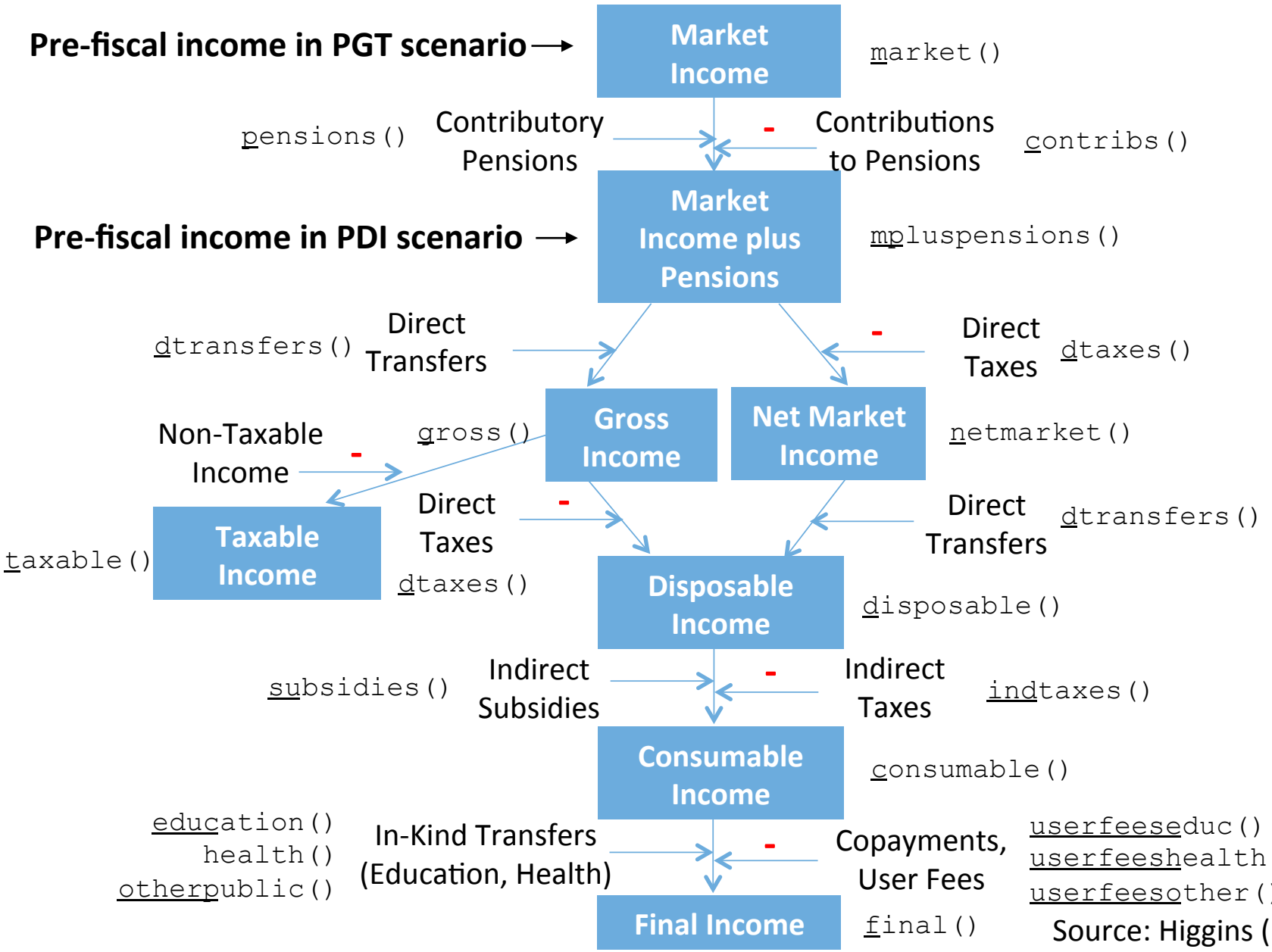
Constructing Income Concepts



Source: Higgins (2017)

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Newest Commands

- `ceqmarg` calculates the marginal contribution of each fiscal intervention to inequality, poverty, reranking
- `ceqef` calculates effectiveness indicators for broad categories (going from one core income concept to another)
- `ceqefext` calculates effectiveness indicators for each fiscal intervention
- `ceqcoverage` calculates coverage and leakages among each income group for each fiscal intervention
- `ceqtarget`: same but among target population

Outline of CEQ Stata Package

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Commands to run first; check basic results

- `ceqppp` as input to other commands
  - Automates PPP conversions
- `ceqassump` gives inequality, poverty, distribution by decile
  - Unlike other commands, no specific options for each income concept
  - Instead list any set of income variables in *varlist*
  - Many uses
    - First glance at results
    - Test effect of different assumptions when constructing income concepts
    - Policy simulations

Commands to run first; check basic results

- `ceqdes` gives non-distributional summary statistics
  - For both income concepts and fiscal interventions
  - % with non-0; mean; median; etc.
- Tip: rather than construct all income concepts first, often teams will start using `ceqassump` and `ceqdes` as they go
  - E.g. construct market income plus pensions and disposable income, use `ceqassump` and `ceqdes`, check these results to see if reasonable
  - Often even produce more results (`ceqlorenz`, `ceqfiscal`, `ceqextend`) and send through CEQ Checking Protocol before constructing consumable, final income

Outline of CEQ Stata Package

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- **More commands**
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More commands

- `ceqlorenz, ceqfiscal, ceqextend` jointly produce a lot of the "main" incidence and concentration results for Section D
- `ceqfi` produces the fiscal impoverishment indicators
- `ceqstatsig` assesses statistical significance of differences in inequality and poverty across core income concepts
  - `ceqextsig` does the same for impact of particular fiscal interventions on inequality and poverty
- `ceqgraph` (with various subcommands) produces graphs of Lorenz curves, concentration curves, CDFs, fiscal impoverishment curves

Outline of CEQ Stata Package

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- More commands
- **Ongoing work: standalone commands for CEQ indicators (fiscal impoverishment, effectiveness)**

Thank you!

Credits

CEQ Institute: Team

TEAM

- ***Nora Lustig**, Director*
- ***Ludovico Feoli**, Director of Policy Area*

- **Core Team** (in alphabetical order):
  - *Maynor Cabrera, Director of Projects and Advisory Services and Associate Director for Latin America & the Caribbean*
  - *Samantha Greenspun, Director of Grants and Project Management*
  - *Sean Higgins, Co-Director of CEQ Data Center and Software Development*
  - *Jon Jellema, Associate Director for Africa, Asia and Europe*
  - *Carlos Martin-del-Campo, Director of Communications*
  - *Israel Martinez, Coordinator of CEQ Masterdata*
  - *Itzel Martinez, Administrative Coordinator*
  - *Sandra Martinez, Co-Director of CEQ Data Center and Software Development*
  - *Estuardo Moran, Associate Director for Latin America & the Caribbean*
  - *Lisa Paterson, Assistant Director*
  - *Stephen Younger, Associate Director for Africa, Asia and Europe*

- **Research Associates** (resident): *Jim Alm, Rodrigo Aranda, Stefano Barbieri, Koray Caglayan, Enrique de la Rosa, Ali Enami, Siyu Quan*
- **Research Assistants**: *Marc Brooks, Cristina Carrera, Ruoxi Li, Michael Ossorguine, Xavi Recchi*

References:

- Aranda, Rodrigo and Adam Ratzlaff. 2017. "Analyzing the Impact of Fiscal Policy on Ethno-Racial Inequality." Chapter 8 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty,* edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).
- Deaton, Angus. 2005. "Measuring Poverty in a Growing World (or Measuring Growth in a Poor World)." *Review of Economics and Statistics* 87: 1-19.
- Enami, Ali. 2017. "Measuring the Effectiveness of Taxes and Transfers in Fighting Poverty and Reducing Inequality in Iran." Chapter 16 in Lustig, Nora, editor. 2017. *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty.* Brookings Institution and the CEQ Institute.
- Enami, Ali, Sean Higgins and Stephen Younger. 2017. "Fiscal Impoverishment and Gains Effectiveness Indicators." Authored box in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty,* edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).
- Enami, Ali, Nora Lustig and Rodrigo Aranda. 2017. "Analytical Foundations: Measuring the Redistributive Impact of Taxes and Transfers," Chapter 2 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty,* edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).
- Heckman, James, Lance J. Lochner, and Petra E Todd. "Earnings Functions, Rates of Return and Treatment Effects: The Mincer Equation and Beyond." In Handbook of the Economics of Education.
- Higgins, Sean. 2017. "Producing Indicators and Results, and Completing Sections D and E of CEQ Master Workbook Using the CEQ Stata Package." Chapter 7 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty,* edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).
- Higgins, Sean and Nora Lustig. 2016. "Can a Poverty-Reducing and Progressive Tax and Transfer System Hurt the Poor?" *Journal of Development Economics* 122: 63-75.
- Higgins, Sean and Nora Lustig. 2017. "Allocating Taxes and Transfers, Constructing Income Concepts, and Completing Sections A, B, and C of CEQ Master Workbook," Chapter 5 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).
- Hlasny, Vladimir and Paolo Verme. Forthcoming. "Top Incomes and the Measuremen of Inequality in Egypt." *World Bank Economic Review.*
- Lustig, Nora. 2017.

Teams and References by Country (the year for which the analysis was conducted in parentheses); C=consumption & I=income)

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1. Argentina (2012-13; I): Rossignolo, Dario. 2017a. "Taxes, Expenditures, Poverty, and Income Distribution in Argentina," Chapter 10 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).

Rossignolo, Dario. 2017b. "CEQ Master Workbook: Argentina. Version: May 19, 2017," CEQ Data Center (CEQ Institute, Tulane University).

2. Armenia (2011; I): Younger, Stephen D. and Artsvi Khachatryan. 2017. "Fiscal Incidence in Armenia," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, edited by Gabriela Inchauste and Nora Lustig. (World Bank).

Younger, Stephen D. and Artsvi Khachatryan. 2014. "CEQ Master Workbook: Armenia. Version: May 31, 2014," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

3. Bolivia (2009; I): Paz Arauco, Veronica, George Gray-Molina, Wilson Jimenez and Ernesto Yañez. 2014a. "Explaining Low Redistributive Impact in Bolivia," in *The Redistributive Impact of Taxes and Social Spending in Latin America*, edited by Nora Lustig, Carola Pessino and John Scott, Special Issue, *Public Finance Review* 42, no 3, pp. 326-345. DOI: 10.1177/1091142113496133

Paz Arauco, Veronica, George Gray-Molina, Wilson Jimenez and Ernesto Yañez. 2014b. "CEQ Master Workbook: Bolivia. Version: September 22, 2014," CEQ Data Center (CEQ Institute, Tulane University).

4. Brazil (2008-09; I): Higgins, Sean and Claudiney Pereira. 2014. "The Effects of Brazil's Taxation and Social Spending on the Distribution of Household Income," in *The Redistributive Impact of Taxes and Social Spending in Latin America*, edited by Nora Lustig, Carola Pessino and John Scott, Special Issue, Public Finance Review 42, 3, pp. 346–67. DOI: 10.1177/1091142113501714

Higgins, Sean and Claudiney Pereira. 2017. "CEQ Master Workbook: Brazil. Version: April 19, 2017," CEQ Data Center (CEQ Institute, Tulane University).

5. Chile (2013, I): Martinez- Aguilar, Sandra, Alan Fuchs, Eduardo Ortiz-Juarez and Giselle del Carmen. 2017. "The Impact of Fiscal Policy on Inequality and Poverty in Chile," Chapter 12 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).

Martinez-Aguilar, Sandra and Eduardo Ortiz-Juarez. 2016. "CEQ Master Workbook: Chile. Version: October 7, 2016," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

6. Colombia (2010, I): Melendez, Marcela and Valentina Martinez. 2015. "CEQ Master Workbook: Colombia. Version: December 17, 2015," CEQ Data Center (CEQ Institute, Tulane University and Inter-American Development Bank).

Teams and References by Country (the year for which the analysis was conducted in parentheses); C=consumption & I=income)

7. Costa Rica (2010; I): Sauma, Pablo and Juan Diego Trejos. 2014a. "Gasto publico social, impuestos, redistribucion del ingreso y pobreza en Costa Rica," CEQ Working Paper 18 (Center for Inter-American Policy and Research and Department of Economics, Tulane University and Inter-American Dialogue), January.

Sauma, Pablo and Juan D. Trejos. 2014b. "CEQ Master Workbook: Costa Rica. Version: February 2014," CEQ Data Center (CEQ Institute, Tulane University).

8. Dominican Republic (2006-07, I): Aristy-Escuder, Jaime, Maynor Cabrera, Blanca Moreno-Dodson and Miguel E. Sanchez-Martin. 2017. "Fiscal Policy and Redistribution in the Dominican Republic," Chapter 13 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).

Aristy-Escuder, Jaime, Maynor Cabrera, Blanca Moreno-Dodson and Miguel Sanchez-Martin. 2016. "CEQ Master Workbook: Dominican Republic. Version: August 4, 2016," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

9. Ecuador (2011-12, I): Llerena Pinto, Freddy Paul, Maria Cristhina Llerena Pinto, Roberto Carlos Saa Daza and Maria Andrea Llerena Pinto. 2015. "Social Spending, Taxes and Income Redistribution in Ecuador," CEQ Working Paper 28 (Center for Inter-American Policy and Research and Department of Economics, Tulane University and Inter-American Dialogue), February.

Llerena Pinto, Freddy Paul, Maria Cristhina Llerena Pinto, Roberto Carlos Saa Daza and Maria Andrea Llerena Pinto. 2017. "CEQ Master Workbook: Ecuador. Version: January 5, 2017," CEQ Data Center (CEQ Institute, Tulane University).

10. El Salvador (2011; I): Beneke, Margarita, Nora Lustig and Jose Andres Oliva. 2017. "The Impact of Taxes and Social Spending on Inequality and Poverty in El Salvador," Chapter 14 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).

Beneke, Margarita, Nora Lustig and Jose Andres Oliva. 2014. "CEQ Master Workbook: El Salvador. Version: June 26, 2014," CEQ Data Center (CEQ Institute, Tulane University and Inter-American Development Bank).

11. Ethiopia (2011; C): Hill, Ruth, Gabriela Inchauste, Nora Lustig, Eyasu Tsehaye and Tassew Woldehanna. 2017. "A Fiscal Incidence Analysis for Ethiopia," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, edited by Gabriela Inchauste and Nora Lustig (World Bank).

Hill, Ruth, Eyasu Tsehaye and Tassew Woldehanna. 2014. "CEQ Master Workbook: Ethiopia. Version: September 28, 2014," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

Teams and References by Country (the year for which the analysis was conducted in parentheses); C=consumption & I=income)

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12. European Union (2011, I): EUROMOD statistics on Distribution and Decomposition of Disposable Income, accessed at http://www.iser.essex.ac.uk/euromod/statistics/ using EUROMOD version no. G2.0.

13. Georgia (2013; I): Cancho, Cesar and Elena Bondarenko. 2017. "The Distributional Impact of Fiscal Policy in Georgia," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, edited by Gabriela Inchauste and Nora Lustig (World Bank).

Cancho, Cesar and Elena Bondarenko. 2015. "CEQ Master Workbook: Georgia. Version: December 31, 2015," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

14. Ghana (2012-13; C): Younger, Stephen, Eric Osei-Assibey and Felix Oppong. 2017. "Fiscal Incidence in Ghana." *Review of Development Economics*. Published electronically January 11, 2017. DOI: 10.1111/rode.12299.

Younger, Stephen, Eric Osei-Assibey, and Felix Oppong. 2016. "CEQ Master Workbook: Ghana, Version: February 10, 2016," CEQ Data Center (CEQ Institute, Tulane University).

15. Guatemala (2011; I): Cabrera, Maynor, Nora Lustig and Hilcias E. Moran. 2015. "Fiscal Policy, Inequality and the Ethnic Divide in Guatemala." *World Development* 76 (December), pp. 263–279. DOI: 10.1016/j.worlddev.2015.07.008.

Cabrera, Maynor and Hilcias E. Moran. 2015a. "CEQ Master Workbook: Guatemala. Version: May 6, 2015," CEQ Data Center (CEQ Institute, Tulane University, Instituto Centroamericano de Estudios Fiscales (ICEFI) and International Fund for Agricultural Development (IFAD)).

16. Honduras (2011; I): Icefi. 2017. "Incidencia de la politica fiscal en el ambito rural de Centro America: el caso de Honduras," CEQ Working Paper 51 (CEQ Institute, Tulane University, IFAD and Instituto Centroamericano de Estudios Fiscales).

Castaneda, Ricardo and Ilya Espino. 2015. "CEQ Master Workbook: Honduras. Version: August 18, 2015," CEQ Data Center (CEQ Institute, Tulane University, Instituto Centroamericano de Estudios Fiscales and International Fund for Agricultural Development).

17. Indonesia (2012; C): Jellema, Jon, Matthew Wai-Poi, and Rythia Afkar. 2017. "The Distributional Impact of Fiscal Policy in Indonesia," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, edited by Gabriela Inchauste and Nora Lustig (World Bank).

Afkar, Rythia, Jon Jellema, and Matthew Wai-Poi. 2015. "CEQ Master Workbook: Indonesia. Version: February 26, 2015," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

Teams and References by Country (the year for which the analysis was conducted in parentheses); C=consumption & I=income)

18. Iran (2011-2012; C & I): Enami, Ali. 2017a. "Measuring the Effectiveness of Taxes and Transfers in Fighting Poverty and Reducing Inequality in Iran." Chapter 16 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).

Enami, Ali, Nora Lustig and Alireza Taqdiri. 2017b. "CEQ Master Workbook: Iran. Version: May 5, 2017," CEQ Data Center (CEQ Institute, Tulane University and Economic Research Forum).

19. Jordan (2010-11; C): Alam, Shamma A., Gabriela Inchauste and Umar Serajuddin. 2017. "The Distributional Impact of Fiscal Policy in Jordan," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countrie*s, edited by Gabriela Inchauste and Nora Lustig (World Bank).

Abdel-Halim, Morad, Shamma A. Alam, Yusuf Mansur, Umar Serajuddin and Paolo Verme. 2016. "CEQ Master Workbook: Jordan. Version: March 8, 2016," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

20. Mexico (2010; C & I): Scott, John. 2014. "Redistributive Impact and Efficiency of Mexico's Fiscal System," in *The Redistributive Impact of Taxes and Social Spending in Latin America*, edited by Nora Lustig, Carola Pessino, John Scott, Special Issue, *Public Finance Review* 42, no. 3, pp. 368-390. DOI: 10.1177/1091142113497394

Scott, John. 2013. "CEQ Master Workbook: Mexico. Version: September 2, 2013," CEQ Data Center (CEQ Institute, Tulane University).

21. Nicaragua (2009; I): Icefi. 2017. "Incidencia de la politica fiscal en la desigualdad y la pobreza en Nicaragua," CEQ Working Paper 52 (CEQ Institute, Tulane University, IFAD and Instituto Centroamericano de Estudios Fiscales).

Cabrera, Maynor and Hilcias E. Moran. 2015b. "CEQ Master Workbook: Nicaragua. Version: October 14, 2015" CEQ Data Center on Fiscal Redistribution (CEQ Institute, Tulane University, Instituto Centroamericano de Estudios Fiscales (Icefi) and International Fund for Agricultural Development (IFAD)).

22. Peru (2009; I): Jaramillo, Miguel. 2014. "The Incidence of Social Spending and Taxes in Peru." in *The Redistributive Impact of Taxes and Social Spending in Latin America*, edited by Nora Lustig, Carola Pessino and John Scott, Special Issue, *Public Finance Review* 42, no. 3, pp. 391-412. DOI: 10.1177/1091142113496134

Jaramillo, M. 2015. CEQ Master Workbook: Peru, August 7. CEQ Institute, Tulane University.

Teams and References by Country (the year for which the analysis was conducted in parentheses); C=consumption & I=income)

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23. Russia (2010; I): Lopez-Calva, Luis Felipe, Nora Lustig, Mikhail Matytsin and Daria Popova. 2017. "Who Benefits from Fiscal Redistribution in Russia?," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, edited by Gabriela Inchauste and Nora Lustig. (World Bank).

Malytsin, Mikhail and Daria Popova. 2016. "CEQ Master Workbook: Russia. Version: March 17, 2016," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

24. South Africa (2010-11; I): Inchauste, Gabriela, Nora Lustig, Mashekwa Maboshe, Catriona Purfield, Ingrid Woolard and Precious Zikhali. 2017. "The Distributional Impact of Fiscal Policy in South Africa," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, edited by Gabriela Inchauste and Nora Lustig. (World Bank).

Inchauste, Gabriela, Nora Lustig, Mashekwa Maboshe, Catriona Purfield, Ingrid Woolard and Precious Zikhali. 2016. "CEQ Master Workbook: South Africa. Version: March 6, 2016," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

25. Sri Lanka (2010; C): Arunatilake, Nisha, Gabriela Inchauste and Nora Lustig. 2017. "The Incidence of Taxes and Spending in Sri Lanka," in *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, edited by Gabriela Inchauste and Nora Lustig (World Bank).

Arunatilake, Nisha, Camilo Gomez, Nipuni Perera and Kaushalya Attygalle. 2016. "CEQ Master Workbook: Sri Lanka. Version: March 10, 2016," CEQ Data Center (CEQ Institute, Tulane University and the World Bank).

26. Tanzania (2011-12; C): Younger, Stephen, Flora Myamba and Kenneth Mdadila. 2016. "Fiscal Incidence in Tanzania." *African Development Review* 28, no. 3, pp. 264-276. DOI: 10.1111/1467-8268.12204. Also in CEQ Working Paper 36 (CEQ Institute, Tulane University, and Ithaca College and REPOA), January.

Younger, Stephen, Flora Myamba, and Kenneth Mdadila. 2016. "CEQ Master Workbook: Tanzania. Version: June 1, 2016," CEQ Data Center (CEQ Institute, Tulane University).

27. Tunisia (2010, C): Jouini, Nizar, Nora Lustig, Ahmed Moummi, and Abebe Shimeles. 2017. "Fiscal Incidence and Poverty Reduction: Evidence from Tunisia," Chapter 17 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).

Jouini, Nizar, Nora Lustig, Ahmed Moummi, and Abebe Shimeles. 2015. "CEQ Master Workbook: Tunisia. Version: October 1, 2015," CEQ Data Center on Fiscal Redistribution (CEQ Institute, Tulane University and African Development Bank).

Teams and References by Country (the year for which the analysis was conducted in parentheses); C=consumption & I=income)

28. Uganda (2012-2013, C & I): Jellema, Jon, Astrid Haas, Nora Lustig and Sebastian Wolf. 2017. "The Impact of Taxes, Transfers, and Subsidies on Inequality and Poverty in Uganda," Chapter 18 in *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty*, edited by Nora Lustig (Brookings Institution Press and CEQ Institute, Tulane University).

Jellema, Jon, Astrid Haas, Nora Lustig, and Sebastian Wolf. 2016. "CEQ Master Workbook: Uganda. Version: July 28, 2016," CEQ Data Center (CEQ Institute, Tulane University and International Growth Center).

29. United States (2011, I): Higgins, Sean, Nora Lustig, Whitney Ruble and Timothy Smeeding. 2016. "Comparing the Incidence of Taxes and Social Spending in Brazil and the United States." *Review of Income and Wealth* 62, no. 1 (August), pp. 22-46. DOI: 10.1111/roiw.12201

30. Uruguay (2009; I): Bucheli, Marisa, Nora Lustig, Maximo Rossi and Florencia Amabile. 2014. "Social Spending, Taxes and Income Redistribution in Uruguay." in *The Redistributive Impact of Taxes and Social Spending in Latin America*, edited by Nora Lustig, Carola Pessino and John Scott, Special Issue, *Public Finance Review* 42, no. 3, pp. 413-433. DOI: 10.1177/1091142113493493

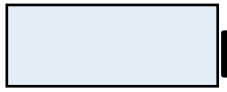
Bucheli, Marisa, Nora Lustig, Maximo Rossi and Florencia Amabile. 2014. "CEQ Master Workbook: Uruguay. Version: August 18, 2014," CEQ Data Center (CEQ Institute, Tulane University).

31. Venezuela (2012; I): Molina, Emiro. 2016. "CEQ Master Workbook: Venezuela. Version: November 15, 2016," CEQ Data Center (CEQ Institute, Tulane University).

Appendix

Classification

A = Pro-poor and equalizing, per capita spending declines with income



B = Neutral in absolute terms and equalizing, same per capita for all

C = Equalizing but not pro-poor, per capita spending as a share of market income declines with income

D = Unequalizing, per capita spending as a share of market income increases with income

	Total Education	Pre-school	Primary	Secondary	Tertiary	Health
Argentina (2012)	A	A	--	--	C	A
Armenia (2011)	A	A	A	--	C	B
Bolivia (2009)	B	A	A	A	C	B
Brazil (2009)	A	A	A	A	C	A
Chile (2013)	A	A	A	A	C	A
Colombia (2010)	--	A	A	A	C	--
Costa Rica (2010)	--	A	A	A	C	--
Dominican Republic (2013)	A	A	A	--	C	A
Ecuador (2011)	A	--	A	C	--	A
El Salvador (2011)	A	A	A	B	C	C
Ethiopia (2011)	C	--	B	C	D	C
Georgia (2013)	B	B	A	--	C	A
Ghana (2013)	C	A	A	C	D	B
Guatemala (2011)	B	A	A	B	D	C
Honduras (2011)	B	A	A	B	C	B
Indonesia (2012)	B	--	A	B	D	C
Iran (2011)	B	--	A	A	C	B
Jordan (2010)	A	A	A	A	C	C
Mexico (2010)	A	A	A	C	C	B
Nicaragua (2009)	B	A	A	B	C	B
Peru (2009)	A	A	A	A	C	C
Russia (2010)	A	--	--	--	--	B
South Africa (2010)	B	A	A	A	C	A
Sri Lanka (2010)	B	A	--	--	C	B
Tanzania (2011)	C	A	A	C	D	C
Tunisia (2010)	B	--	--	--	C	B
Uganda (2013)	C	--	A	C	D	B
Uruguay (2009)	A	A	A	A	C	A
Venezuela (2013)	A	A	A	A	B	A

Source: Lustig (2017)

Main Results

- Education spending on primary schooling per person tends to decline with income ("pro-poor") …
  - … with the exception of Ethiopia where is the same across the income distribution (neutral in absolute terms)

- Education spending on secondary schooling per person tends to decline with income ("pro-poor") or be the same across the income distribution…
  - Are middle-classes opting out in middle and high income countries?

- Tertiary education spending is not pro-poor but it is equalizing except for Ethiopia, Ghana, Guatemala, Indonesia, Tanzania, and Uganda, where it is unequalizing

Source: Lustig (2017)