Day 1 – Session 2b
CEQ Effectiveness Indicators

Ali Enami
CEQ Institute, Tulane University

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Effectiveness

- An indicator that you typically would think of:

$$\Delta Gini/Spending$$

- Problem: Fiscal interventions of larger size would d worse by definition because higher spending results in incrementally lower declines in Gini => leads to improper ranking of fiscal interventions

Effectiveness

Desirable properties:

- Ranks interventions properly
- Be within a certain range (i.e., between 0 and 1 or -1 and 1)
- Intuitively appealing interpretation
- ….

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:
  - Disposable Income without Direct Taxes (before)
    - *Market Income + Direct Transfers,* or
    - *Disposable Income + Direct Taxes.*
  - Disposable Income (after)

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

CEQ Effectiveness Indicators

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

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

1. Impact Effectiveness (1)

- 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 (and/or B) is distributed differently among individuals.

- For Poverty Indices (e.g. Poverty headcount ratio):
  - **Transfers:** Above formula is applicable.
  - **Taxes:**

$$Poverty\ Impact\ Effectiveness{\downarrow}T{\uparrow}End\ income = -MC{\downarrow}T{\uparrow}End\ income\ /\ MC{\downarrow}T{\uparrow}End\ income\ {\uparrow}H$$

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

1. Impact Effectiveness (2)

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

- It is interpreted as the relative realized power of a tax, a transfer or a combination of taxes and transfers in reducing inequality or poverty (with the exception of taxes in the case of poverty).

- In the context of poverty and only for the taxes, the interpretation is as follows: the relative realized power of a tax to hurt the poor. The more negative the indicator is, the more potential for harm is realized.

- For example: if in the context of inequality, the impact effectiveness of a transfer is equal to 0.7, it means the transfer has realized 70% of its potential power in reducing inequality.

1. Impact Effectiveness (3)

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	**0.2564**	**0.2540**	**0.2871**
Direct Transfers	Targeted Subsidy Program	0.3880	0.3936	0.3839
	Social Assistance	0.4250	0.4369	0.4490
	Semi-cash Transfers (Food)	-0.0214	-0.0245	-0.0319
	Total Direct Transfers	**0.4194**	**0.4239**	**0.4110**
Indirect Taxes (Sales Taxes)		-	**-0.1395**	**-0.1303**
In-kind Transfers	Education Transfers	-	-	0.2327
	Education User-fees	-	-	0.1630
	Health Transfers	-	-	0.3287
	Health User-fees	-	-	-0.2490

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

2. Spending Effectiveness (1)

- It is only applicable to the taxes and transfers with <u>positive</u> Marginal Contribution.

$$Spending\ Effectiveness_{\downarrow T\ (and/or\ B)\uparrow End\ income} = T\uparrow^{*}\ (and/or\ B\uparrow^{*})/T\ (and/or\ B)\quad ,$$

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.
- **It has an efficiency interpretation:** How much less distortionary taxes and transfers is needed to achieve the same social goal (in terms of the inequality or poverty index of interest).

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2. Spending Effectiveness (2)

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

Note: The Gini coefficient is the index used to calculate the effectiveness indicator here. Fiscal interventions with an N/A are the ones with a negative marginal contribution which it is mathematically impossible to calculate the spending effectiveness for them.

3. Fiscal Impoverishment and Gains Effectiveness (1)

- It is only applicable to the poverty indicators.

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

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

3. Fiscal Impoverishment and Gains Effectiveness (2)

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

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

Where T and B are the size of total taxes and transfers (both positive values), $FGP\_MC{\downarrow}B{\uparrow}End\ income$ is the marginal contribution of transfer B to FGP (always a non-negative value) and $FI\_MC{\downarrow}T{\uparrow}End\ income$ is the marginal contribution of tax T to FI (always a non-negative value).

- For individual taxes and transfers:

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

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

3. Fiscal Impoverishment and Gains Effectiveness (3)

Fiscal Incident		$4PPP FI-FGP Effectiveness with respect to:	
		Disposable Income	Consumable Income
Direct Taxes and Contributions	Income Tax	0.9994	0.9987
	Employee contributions to the health insurance	0.9921	0.9895
	Employer contributions to the health insurance	0.9981	0.9971
	Employee contributions to the Social Security	0.9956	0.9943
	Employer contributions to the Social Security	0.9995	0.9991
	Total Direct Taxes and Contributions	**0.9976**	**0.9969**
Direct Transfers	Targeted Subsidy Program	0.1297	0.1441
	Social Assistance	0.1813	0.2050
	Semi-cash Transfers (Food)	0.0342	0.0385
	Total Direct Transfers	**0.1422**	**0.1569**
Indirect Taxes (Sales Taxes)		**-**	**0.9587**
Total System		**0.4094**	**0.4829**

Thank you!

Reference

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