



CEQ INSTITUTE
COMMITMENT TO EQUITY

Tulane University

Fiscal Policy, Inequality, and Poverty in Iran: Assessing the Impact and Effectiveness of Taxes and Transfers

Ali Enami, Nora Lustig, and Alireza Taqdiri

7th ECINEQ Meeting
City University of New York
New York City, NY
July 18, 2017

Acknowledgement: Financial support for this project is provided by the Bill & Melinda Gates Foundation and Economic Research Forum.

Motivation and Contribution

- **General Incidence Analysis:** Iran's fiscal system
- **Focus:** Energy subsidy reform of 2010
- **Contributions**
 - A relatively comprehensive and recent incidence analysis of taxes and transfers in Iran.
 - Iranian Household Expenditure and Income Survey (HEIS) for the Persian calendar year 1390 (2011-12).
 - A better assessment of the energy subsidy reform using a more reliable data base.
 - Introduction of new effectiveness indicators.

Main Results (1)

- **Total Fiscal System:**
 - Reduces Gini by 0.0854 (to 0.3432).
 - Reduces Poverty Head Count ratio by 10.5 percentage points (to 10.6%).
- **Energy Subsidy Reform (TSP):**
 - Reduces Gini by 0.0465.
 - Reduces Poverty Head Count ratio by 11.90 percentage points.
 - Urban: 7.8 percentage points (to 5.6%).
 - Rural: 21.9 percentage points (to 22.8%).

Main Results (2)

- **Effectiveness of the TSP**
 - **Inequality**
 - **Impact Effectiveness: 38.41%**
 - **Spending Effectiveness: 26.51%**
 - **Poverty**
 - **FI-FGP Effectiveness: 14.92%**
- **By slightly better targeting the TSP toward lower income deciles, the effectiveness of cash subsidy would increase significantly.**
 - **Impact Effectiveness: 76.13%**
 - **Spending Effectiveness: 60.41%**
 - **FI-FGP Effectiveness: 21.60%**

Presentation Overview

- Introduction
 - Iran's fiscal system.
 - Targeted Subsidy Program (TSP).
- Data:
 - Iranian Household Expenditure and Income Survey (HEIS) for the Persian calendar year 1390 (2011-12).
- Methodology and Results
 - Commitment to Equity (CEQ) methodology: Marginal contribution.
 - Effectiveness indicators.
- Policy simulations (if time allows).
- Concluding Remarks.

Iran's Fiscal System: Government Revenue

Categories	% of total revenue	% of GDP	Included?
Total Revenues	100%	27.00%	
Tax revenues	24.07%	6.50%	
Direct taxes, of which:	14.21%	3.84%	
Personal Income Tax	3.14%	0.85%	Yes
Corporate Income Tax	10.26%	2.77%	No
Wealth Tax	0.81%	0.22%	No
Indirect Taxes	9.86%	2.66%	Yes
Non-tax revenues	75.93%	20.50%	
Sales of natural resources, capital, and financial assets	55.23%	14.91%	No
Other Revenues	20.70%	5.59%	No

- Total Revenue: 1,697,255 billion Rials (about 163.76 billion dollars).
- GDP: 6,285,255 billion Rials (about 606.45 billion dollars).

Iran's Fiscal System: Government Expenditures

Categories	% of total expenditure	% of GDP	Included?
Total expenditure	100%	27.00%	
Social spending	50.68%	13.69%	
Targeted Subsidy Program	10.91%	2.95%	Yes
Social protection	11.84%	3.20%	
Social assistance	3.85%	1.04%	Yes
Social security (pensions)	7.99%	2.16%	Yes
Education, of which:	16.58%	4.48%	
12-K (Primary and Secondary)	7.79%	2.10%	Yes
Adult Literacy	0.14%	0.04%	No
Tertiary	7.89%	2.13%	Yes
Other	0.76%	0.20%	No
Health	9.24%	2.50%	Yes
Housing (urban and rural)	2.12%	0.57%	No
Other expenditures	49.32%	13.32%	No

- Total Expenditure: 1,697,255 billion Rials (about 163.76 billion dollars).
- GDP: 6,285,255 billion Rials (about 606.45 billion dollars).

Targeted Subsidy Program (TSP)

- Implemented in December 2010.
- Energy and bread subsidies were replaced with an unconditional cash transfer.
- Every Iranian was eligible to receive it:
 - The amount of cash transfer was 455,000 Rials per person per month (about \$40).
- The government justified this reform on two main grounds:
 - The high fiscal burden of the energy subsidies: 20% of GDP in 2010 (or \$70 billion US dollars).
 - The energy subsidies were disproportionately benefitting the non-poor.
- No violence or civil unrest occur.

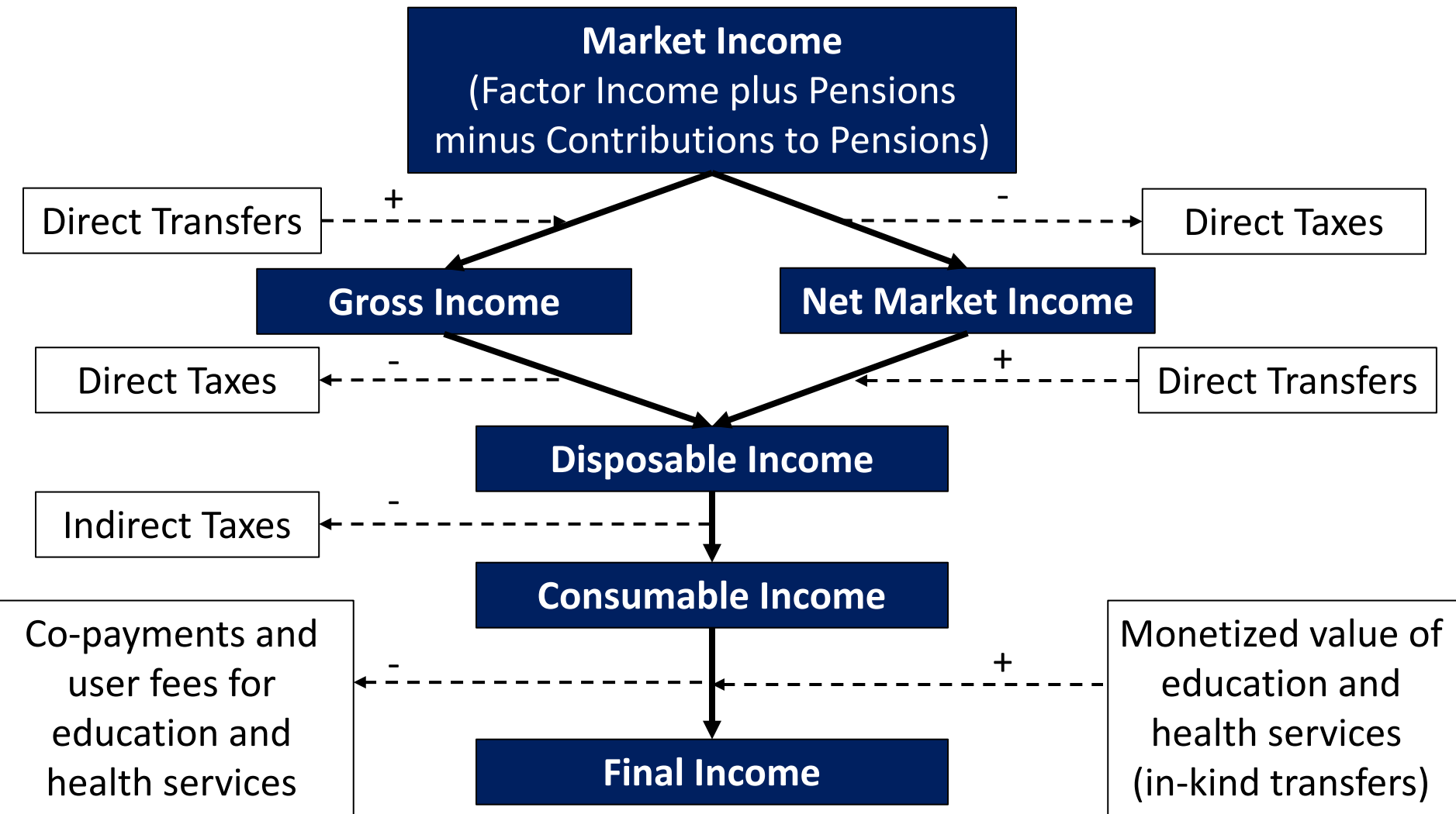
Data

- Iranian Household Expenditure and Income Survey (HEIS) for the Persian calendar year 1390 (2011-12).
 - Urban sample: 18,727 households (15.4M HH, 56.4M individuals).
 - Rural sample: 19,786 households (5.7M HH, 23.1M individuals).
- The value of education and health subsidies as well as sales taxes are imputed while the rest (e.g. pensions, direct taxes and transfers) are observed directly in the survey.
- Specifically, it allows clear identification of households who received cash transfer through the Targeted Subsidy Program.

Distribution of Individuals and Households According to Socio-economic Group

In Daily US 2005 PPP	Socio-Economic Group	Number of individuals (% share)	Number of households (% share)	Avg. size of HH
0 to 1.25	Ultra Poor	2,875,462	729,004	3.9
		(3.62%)	(3.45%)	
1.25 to 2.5	Extreme Poor	5,284,959	1,305,675	4.0
		(6.65%)	(6.17%)	
2.5 to 4	Moderate Poor	8,586,729	1,930,893	4.4
		(10.80%)	(9.13%)	
4 to 10	Vulnerable	32,281,101	7,810,339	4.1
		(40.60%)	(36.91%)	
10 to 50	Middle Class	29,755,312	9,026,572	3.3
		(37.42%)	(42.66%)	
50 or more	High Income Class	728,130	356,549	2.0
		(0.92%)	(1.69%)	
Total		79,511,694	21,159,033	3.8

The Construction of Income Concepts



Inequality Indices for the Main Income Concepts

Index	Market Income (MI)	Net MI	Gross MI	Disposable Income	Consumable Income	Final Income
Gini	0.4286	0.4268	0.3715	0.3686	0.3712	0.3432
Absolute Gini	11157234	10769107	11217766	10833725	10562329	10577442
S-Gini v=1.25	0.1913	0.1899	0.1615	0.1596	0.1612	0.1495
S-Gini v=1.5	0.3087	0.3064	0.2603	0.2572	0.2597	0.2418
S-Gini v=2.5	0.5350	0.5309	0.4502	0.4449	0.4489	0.4237
S-Gini v=3	0.5926	0.5881	0.4984	0.4926	0.4971	0.4715
Theil	0.3314	0.3299	0.2505	0.2478	0.2514	0.2122
90/10	8.47	8.26	5.48	5.35	5.45	4.67

Poverty Indices for the Main Income Concepts

Index (Poverty line in daily US 2005 PPP)		Market Income (MI)	Net MI	Gross MI	Disposable Income	Consumable Income
1.25	Headcount	0.0362	0.0367	0.0026	0.0027	0.0034
	Poverty Gap	0.0136	0.0139	0.0009	0.0009	0.0014
	Squared Poverty Gap	0.0074	0.0076	0.0005	0.0005	0.0009
2.5	Headcount	0.1026	0.1045	0.0204	0.0212	0.0259
	Poverty Gap	0.0399	0.0405	0.0048	0.0050	0.0065
	Squared Poverty Gap	0.0225	0.0229	0.0021	0.0021	0.0029
4	Headcount	0.2106	0.2156	0.0915	0.0939	0.1057
	Poverty Gap	0.0829	0.0847	0.0224	0.0228	0.0269
	Squared Poverty Gap	0.0467	0.0475	0.0087	0.0089	0.0109

Marginal Contribution

- **Marginal Contribution** of a tax (or benefit) to inequality (poverty): The difference between having and not-having that tax (transfer)

$$MC_{T \text{ (or } B)}^{\text{End income}} = \text{Index}_{\text{End income} \setminus T \text{ (or } B)} - \text{Index}_{\text{End income}}$$

- For example, the marginal contribution of TSP to reduction in inequality with respect to Disposable Income:

$$MC_{TSP}^{\text{Disposable income}} = \text{Gini}_{\text{Disposable Income} \setminus TSP} - \text{Gini}_{\text{Disposable Income}}$$

Enami, Ali, Nora Lustig, and Rodrigo Aranda Balcazar. Forthcoming. "Analytical Foundations: Measuring the Redistributive Impact of Taxes and Transfers". Chapter 2 in N. Lustig (Ed.) "Commitment to Equity Handbook. A Guide to Estimating the Impact of Fiscal Policy on Inequality and Poverty". Brookings Institution Press and CEQ Institute, Tulane University.

Marginal Contribution of Taxes and Transfers to Inequality

Fiscal Intervention		Progressivity (Kakwani)	MC to the Gini index of:		
			DI (0.3686)	CI (0.3712)	FI (0.3432)
Direct Taxes and Contributions	Income Tax	0.2274	0.0018	0.0018	0.0019
	Employee cont. to the health ins.	0.0002	0.0003	0.0002	0.0004
	Employer cont. to the health ins.	0.0455	0.0008	0.0007	0.0009
	Total Direct Taxes and Cont.	0.0855	0.0029	0.0028	0.0032
Direct Transfers	Targeted Subsidy Program	0.4164	0.0527	0.0552	0.0465
	Social Assistance	0.8205	0.0043	0.0045	0.0040
	Semi-cash Transfers (Food)	0.3018	<0.0000	<0.0000	<0.0000
	Total Direct Transfers	0.4384	0.0583	0.0611	0.0516
Indirect Taxes (Sales Taxes)		-0.1363	-	-0.0026	-0.0025
In-kind Transfers	Education Transfers	0.3485	-	-	0.0226
	Education User-fees	0.0682	-	-	0.0018
	Health Transfers	0.4171	-	-	0.0177
	Health User-fees	0.1611	-	-	-0.0075
	Total In-kind Transfers	0.5886	-	-	0.0290

Marginal Contribution of Taxes and Transfers to Poverty

Fiscal Intervention		MC to the \$4 PPP poverty headcount index of:	
		Disposable Income (0.0939)	Consumable Income (0.1057)
Direct Taxes and Contributions	Income Tax	-0.0004	-0.0005
	Employee contributions to the health insurance	-0.0013	-0.0002
	Employer contributions to the health insurance	-0.0008	-0.0007
	Total Direct Taxes and Contributions	-0.0024	-0.0021
Direct Transfers	Targeted Subsidy Program	0.1131	0.1190
	Social Assistance	0.0104	0.0111
	Semi-cash Transfers (Food)	0.0001	0.0002
	Total Direct Transfers	0.1217	0.1277
Indirect Taxes (Sales Taxes)		-	-0.0118

Impact Effectiveness: Definition

- Originally suggested by Fellman, Jäntti, and Lambert (1999) in the context of inequality measures.
- It is based on the idea of “optimal” impact and in the context of inequality measures it is defined as follows:

$$\text{Inequality Impact Effectiveness}_{T \text{ (or B)}}^{\text{End income}} = \frac{MC_{T \text{ (or B)}}^{\text{End income}}}{MC_{T \text{ (or B)}}^{\text{End income}*}}$$

- where $MC_{T \text{ (or B)}}^{\text{End income}*}$ is the maximum possible $MC_{T \text{ (or B)}}^{\text{End income}}$ if the same amount of tax (or benefit) is levied on (distributed among) individuals optimally

Fellman, Johan, Markus Jäntti, and Peter J. Lambert. 1999. “Optimal Tax-Transfer Systems and Redistributive Policy.” Scandinavian Journal of Economics 101, no. 1. pp. 114-126.

Impact Effectiveness: Properties

- 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).
- 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.
- 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.

Impact Effectiveness Indicators for Taxes and Transfers

Fiscal Intervention		Impact Effectiveness with respect to:		
		DI	CI	FI
Direct Taxes and Contributions	Income Tax	0.3239	0.3532	0.3844
	Employee cont. to the health ins.	0.0515	0.0382	0.0829
	Employer cont. to the health ins.	0.1288	0.1319	0.1595
	Total Direct Taxes and Cont.	0.1847	0.1758	0.2087
Direct Transfers	Targeted Subsidy Program	0.3924	0.3962	0.3841
	Social Assistance	0.4239	0.4202	0.4303
	Semi-cash Transfers (Food)	-0.0362	-0.0391	-0.0437
	Total Direct Transfers	0.4183	0.4211	0.4053
Indirect Taxes (Sales Taxes)		-	-0.1370	-0.1391
In-kind Transfers	Education Transfers	-	-	0.2322
	Education User-fees	-	-	0.1563
	Health Transfers	-	-	0.3298
	Health User-fees	-	-	-0.2455

Spending Effectiveness: Definition

- It is based on the idea of “optimal” size and it is defined as follows:

$$\textit{Spending Effectiveness}_{T \text{ (or } B)}^{\textit{End income}} = \frac{T^* \text{ (or } B^*)}{T \text{ (or } B)}$$

- where T^* (or B^*) is the minimum amount of tax (or benefit) that is needed to create the same $MC_{T \text{ (or } B)}^{\textit{End income}}$ if the tax (or benefit) were optimally redistributed.

Enami, Ali. Forthcoming. “Measuring the Effectiveness of Taxes and Transfers in Fighting Poverty and Inequality in Iran”. Chapter 16 in N. Lustig (Ed.) “Commitment to Equity Handbook. A Guide to Estimating the Impact of Fiscal Policy on Inequality and Poverty”. Brookings Institution Press and CEQ Institute, Tulane University.

Spending Effectiveness: Properties

- It is only applicable to the taxes and transfers with positive marginal contribution.
- This Indicator is always between 0 and +1 and the higher its value, the better it is.
- **It also 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).

Spending Effectiveness Indicators for Taxes and Transfers

Fiscal Intervention		Impact Effectiveness with respect to:		
		DI	CI	FI
Direct Taxes and Contributions	Income Tax	0.3190	0.3101	0.3511
	Employee cont. to the health ins.	≅0	≅0	≅0
	Employer cont. to the health ins.	0.1237	0.1145	0.1360
	Total Direct Taxes and Cont.	0.1645	0.1595	0.1887
Direct Transfers	Targeted Subsidy Program	0.2847	0.2871	0.2651
	Social Assistance	0.4022	0.4066	0.3999
	Semi-cash Transfers (Food)	N/A	N/A	N/A
	Total Direct Transfers	0.2942	0.2971	0.2753
Indirect Taxes (Sales Taxes)		-	N/A	N/A
In-kind Transfers	Education Transfers	-	-	0.1750
	Education User-fees	-	-	0.1513
	Health Transfers	-	-	0.2700
	Health User-fees	-	-	N/A

Fiscal Impoverishment and Gains Effectiveness: Definition (1)

- How much a tax (or benefit or a combination of them) could be effective in reducing poverty (gap).
- 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. 2016. "Can a poverty-reducing and progressive tax and transfer system hurt the poor?." Journal of Development Economics 122: 63-75.

Fiscal Impoverishment and Gains Effectiveness: Definition (2)

- For a Tax:

$$FI_FGP_T = \frac{T - FI_MC_T^{End\ income}}{T}$$

- For a Transfer:

$$FI_FGP_B = \frac{FGP_MC_B^{End\ income}}{B}$$

- For a combination of taxes and transfers:

$FI_FGP_{Total\ system}$

$$= \left[\left(\frac{B}{T + B} \right) \left(\frac{FGP_MC_B^{End\ income}}{B} \right) \right] + \left[\left(\frac{T}{T + B} \right) \left(\frac{T - FI_MC_T^{End\ income}}{T} \right) \right]$$

Enami, Ali. Forthcoming. "Measuring the Effectiveness of Taxes and Transfers in Fighting Poverty and Inequality in Iran". Chapter 16 in N. Lustig (Ed.) "Commitment to Equity Handbook. A Guide to Estimating the Impact of Fiscal Policy on Inequality and Poverty". Brookings Institution Press and CEQ Institute, Tulane University.

FI-FGP Effectiveness: Properties

- The indicator is defined using the poverty gap indicator.
- This is one of the few cases that the idea of dividing “impact” by “size” is appropriate since in the “optimal” scenario, the poverty gap has a linear relationship with the size of a fiscal intervention.
- This Indicator is always between 0 and +1 and the higher its value, the better it is.
- One can not compare the effectiveness of taxes to transfers because the definitions of FI-FGP effectiveness for these two types of fiscal interventions are very different conceptually.

FI-FGP Effectiveness Indicators for Taxes and Transfers

Fiscal Intervention		\$4PPP FI-FGP Effectiveness with respect to:	
		Disposable Income	Consumable Income
Direct Taxes and Contributions	Income Tax	0.9984	0.9964
	Employee contributions to the health insurance	0.9879	0.9837
	Employer contributions to the health insurance	0.9964	0.9955
	Total Direct Taxes and Contributions	0.9945	0.9923
Direct Transfers	Targeted Subsidy Program	0.1340	0.1492
	Social Assistance	0.1826	0.2069
	Semi-cash Transfers (Food)	0.0344	0.0387
	Total Direct Transfers	0.1464	0.1619
Indirect Taxes (Sales Taxes)		-	0.9567
Total System		0.2811	0.3886

If Time Allows...

- How does the effectiveness of a subsidy program change when it is better targeted toward the poor?
 - The case of “Targeted Subsidy Program” in Iran.

**Skip to the summary
of policy simulations**

Targeted Subsidy Program: Alternative Policies (1)

Policy	Marginal contribution to the Gini index of:		
	DI	CI	FI
Baseline (All income deciles receive the subsidy)	0.0527 (Gini of DI: 0.3686)	0.0552 (Gini of CI: 0.3712)	0.0465 (Gini of FI: 0.3432)
No reform: Individuals receive consumption subsidy	0.0088 (Gini of DI: 0.4126)	0.0095 (Gini of CI: 0.4170)	0.0080 (Gini of FI: 0.3813)
Second phase: No subsidy for top 20%	0.0628 (Gini of DI: 0.3586)	0.0655 (Gini of CI: 0.3609)	0.0559 (Gini of FI: 0.3336)
Policy Simulation 1: No subsidy for top 40% and an extra 30% for bottom 60%	0.0834 (Gini of DI: 0.3379)	0.0868 (Gini of CI: 0.3397)	0.0742 (Gini of FI: 0.3153)
Policy Simulation 2: No subsidy for top 40% and an extra 60% for bottom 30%	0.0916 (Gini of DI: 0.3297)	0.0953 (Gini of CI: 0.3312)	0.0816 (Gini of FI: 0.3080)

Targeted Subsidy Program: Alternative Policies (2)

Policy	Marginal contribution to the \$4 PPP poverty headcount index (PHI) of:	
	Disposable Income(DI)	Consumable Income(CI)
Baseline (All income deciles receive the subsidy)	0.1131 (PHI of DI: 0.0939)	0.1190 (PHI of CI: 0.1057)
No reform: Individuals receive consumption subsidy	0.0238 (PHI of DI: 0.1832)	0.0254 (PHI of CI: 0.1993)
Second phase: No subsidy for top 20%	0.1131 (PHI of DI: 0.0939)	0.1190 (PHI of CI: 0.1057)
Policy Simulation 1: No subsidy for top 40% and an extra 30% for bottom 60%	0.1387 (PHI of DI: 0.0682)	0.1469 (PHI of CI: 0.0778)
Policy Simulation 2: No subsidy for top 40% and an extra 60% for bottom 30%	0.1578 (PHI of DI: 0.0492)	0.1679 (PHI of CI: 0.0568)

Targeted Subsidy Program: Alternative Policies (3)

Policy	Impact Effectiveness with respect to:		
	Disposable Income	Consumable Income	Final Income
Baseline	0.3924	0.3962	0.3841
No reform	0.1751	0.1802	0.1809
Second phase	0.5248	0.5266	0.5222
Policy Simulation 1	0.7005	0.6973	0.6939
Policy Simulation 2	0.7614	0.7646	0.7613

Policy	Spending Effectiveness with respect to:		
	Disposable Income	Consumable Income	Final Income
Baseline	0.2847	0.2871	0.2651
No reform	0.1485	0.1551	0.1448
Second phase	0.4111	0.4134	0.3875
Policy Simulation 1	0.5747	0.5764	0.5396
Policy Simulation 2	0.6435	0.6453	0.6041

Targeted Subsidy Program: Alternative Policies (4)

Policy	\$4PPP FI-FGP Effectiveness with respect to:	
	Disposable Income	Consumable Income
Baseline	0.1340	0.1492
No reform	0.1133	0.1270
Second phase	0.1587	0.1766
Policy Simulation 1	0.1799	0.2012
Policy Simulation 2	0.1921	0.2160

Summary of Policy Simulations

- A direct cash transfer program that reaches the low-income household outperforms the indirect subsidies (e.g. energy subsidies) significantly.
 - TSP:
 - Reduces Gini by **0.0465**.
 - Reduces Poverty Head Count ratio by **11.90** percentage points.
 - While the energy subsidies:
 - Reduces Gini by **0.0080**.
 - Reduces Poverty Head Count ratio by **2.5** percentage points.
- The more targeted a cash transfer program is, the more effective it is in reducing inequality and poverty.



CEQ INSTITUTE
COMMITMENT TO EQUITY

Tulane University

Thank You!