Applied Economics Studies, Iran (AESI) 45

Volume 8, Number 29, Spring 2019

An Investigation of the Effects of Targeted Subsidies on Self-employment and Wage and Salary Earners with an Emphasis on Poverty and Inequality

Darvishi, B.[1*], Mohammadian, F.[2], Ahmadikhah, M.[3]

Abstract

The main objective of this article is to investigate the impact of targeted subsidies law on poverty and inequality among Self-employment and wage and salary earners in Iran. Contrary to the literature which is based on the comparison between the absolute values of indicators, this study employs the statistical confidence intervals. To doing so, we use rural and urban household's expenditure-income data during 2006-2017 and gini and FGT indices. Although the absolute values of indicators showed that they improve during 2012-2017 in compare to 2006-2010 period, but the results of indicators difference based on the statistical confidence intervals do not confirm this findings, for example in the years after targeted subsidies implementation, the inequality rate decreased for these two professional groups in rural areas, however, the inequality rate increased among wage and salaries earners for urban areas and there was not any significant change for self-employed jobs. Without the consideration of geographical areas, targeted subsidies aggravated inequality among wage and salaries earners. In this regard, the results of poverty indicators showed that wage and salaries earners share of total poverty is fixed in urban areas and it increased in rural areas during the fifth development plan and without consideration of geographical area, the headcount poverty and poverty gap increased for these two professional groups. Therefore, in order to correct policy-making, the judge about the impacts of policies based on the comparison of indicators absolute values is not enough and it requires more accurate investigations at the professional subgroups level.

Keywords: Poverty, Inequality, Targeted subsidies law, Self-employment and wage and salary earners

Jel Classification: P36, I38, I32.

1. Introduction

The widespread disturbances caused by commodity subsidies (especially energy subsidies) led Iran to eliminate commodity subsidies on December 16, 2010, with the purpose of establishing justice and competitiveness, and changing them into universal subsidies that were mistakenly called targeted subsidies. The goal of targeting is to ensure that the benefits of poverty reduction programs are targeted

1. Assistant Professor in Economics, Ilam University **Email:** Darvishi_b@yahoo.com
2. Visiting Lecturer, the Economics Group of Ilam University **Email:** Mohamadyan_f@yahoo.com
3. M.A in Economics, Ilam University **Email:** Mahin.a1392@gmail.com

at the poor. On the other hand, these methods will prevent the waste of resources and increase the benefits of a limited budget for the poor. These benefits are based on the assumption that the government is able to distinguish the poor from the non-poor, but in Iran, due to structural weaknesses in the tax system and supportive institutions, governments don't have the ability to identify the poor. Accordingly, cash subsidies were not distributed in a targeted manner causing its effects on the welfare status of the poor to attract the attention of economists as a scientific question. According to the results of most studies conducted in this field (Parvin, and Mastali Parsa, 2017; Hajipour and Fallsolyman, 2016; Sohaili.et al., 2017; Ranjbar et al (2014), Sadeghi et al (206), Shahnazi.et.al (2014)) targeted subsidy has a negative effect on welfare, poverty and inequality. A limited number of studies (Rahiminia and Akbari Moghadam. (2016). Ahmadi et al. (201), Emami et al. (2016)), however, have found a positive effect. According to these studies, it is not possible to comment with certainty on the effect of universal subsidies on poverty and inequality. In this regard, this study to investigated the effect of targeted subsidy law enforcement on poverty and inequality among the self-employed and Wage and Salary Earners in Iran. More importantly, judgment of previous studies about decreasing or increasing poverty and inequality as the result of targeted subsidies is based on comparing absolute values of indices, while this study examined changes in inequality and poverty indices based on a statistical confidence interval.

2. Method

This study uses Iranian households' income-expenditure data separated based on urban and rural areas for two occupational groups (Self-employed and Wage and Salary Earners) during the period of 2006-2017. To calculate the absolute poverty line, the recommended basket of Islamic Republic of Iran, Institute of Nutrition, by 294.42 kcal and Orshansky's approach were used as follows:

$$TAP = FAP.\left(\frac{FC + NFC}{FC}\right) = FAP.\left(1 + \frac{NFC}{FC}\right) = FAP + FAP.\frac{NFC}{FC} \qquad (1)$$

Where, TAP stands for total absolute poverty line, FAP represents food absolute poverty line, and FC and NFC are the total cost of food and nonfood, respectively. In this study, Gini coefficient and the Foster-Greer-Thorbecke (FGT) indices were used to study inequality and poverty, in which the decomposition and difference between two indicators are estimated as follows.

2-1. Decomposition and difference of inequality index

According to Arar and **Douglas** (2013), the Gini coefficient is decomposed as follows:

$$\mathrm{I} = \sum_{g=1}^{G} \phi_g \varphi_g I_g + \bar{I} + R \qquad (2)$$

Where, G is the number of demographic subgroups, ϕ_g and φ_g are the population and income shares of the g subgroup, respectively, $\bar{I}$ denotes the intergroup inequality (When the group's average income is allocated to each individual) and R indicates the income overlap of the two groups.

To construct confidence intervals, Davidson (2009) formulated the Gini coefficient as follows.

$$\widehat{G} = \frac{2}{\hat{\mu} n^2} \sum_{i=1}^{n} y_{(i)} \left(i - \frac{1}{2} \right) - 1 \quad (3)$$

Where, $y_{(i)}$ is the income and $\hat{\mu}$ represents its average. By finding an approximate expression for $\hat{G}$ bias and using it, Davidson described the modified Gini coefficient ($\tilde{G}$) as follows.

$$\tilde{G} = \frac{n}{n-1} \hat{G} \quad (4)$$

Then the standard error G is calculated as follows.

$$SE(\tilde{G}) = \sqrt{\frac{1}{(n\hat{\mu})^2} \sum_{i=1}^{n} (\tilde{z}_i - \bar{z})^2}$$

$$\tilde{z}_i = -(\tilde{G} + 1) y_{(i)} + 2(w_i - v_i)$$

$$w_i = (2i - 1) y_{(i)} / 2n \quad , v_i = n^{-1} \sum_{j=1}^{i} y_{(i)}$$

Now, the confidence interval can be defined using the standard deviation of the Gini coefficient, and based on this, the significance of the difference between the two Gini coefficients can be investigated.

2-2. Decomposition and difference of the FGT indices

In order to decompose the FGT **indices**, according to Lubrano (2012), if y ($y_R + y_{u=} y$) is the total income and yu and y_R shares are equal to p and p-1, respectively, the total poverty can be decomposed as follows:

$$p_\alpha \leq z + (1 - p) . \frac{1}{n} \sum_{i=1}^{n_R} \left(\frac{z - x_i^R}{z} \right)^\alpha \Pi x_i \leq z \quad (5)$$

$$p_\alpha = p . \frac{1}{n} \sum_{i=1}^{n_u} \left(\frac{z - x_i^u}{z} \right)^\alpha \Pi x_i$$

$$z = p . p_\alpha^u + (1 - p) . p_\alpha^R$$

Where pα represents the total poverty index and p_α^u and p_α^R, are the indicators of rural and urban population poverty, respectively. In order to investigate the difference in FGT, consider a sample with *n* households with $x_1, \dots x_n$ revenues. And q is the rank of the poorest person or household. In this case, the Consistent estimator of FGT is as follows.

$$\hat{p}_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - x_{li}}{z}\right)^\alpha \tag{6}$$

By using central limit theorem for α = 0, we will have:

$$\sqrt{n}(\hat{p}_\alpha - p_\alpha) \sim N(0, \sigma^2)$$
$$\sigma^2 = E(\hat{p}_\alpha - p_\alpha)^2 = \int_0^z \left(\frac{x - z}{z}\right)^{2\alpha} f(x)dx - p_\alpha^2 \tag{7}$$
$$\hat{\sigma}^2 = \hat{p}_{2\alpha} - \hat{p}_\alpha^2$$

The standard deviation of $\hat{p}_\alpha$ is estimated as $\hat{\sigma}_p = \hat{\sigma}/\sqrt{n}$. Then, the random variable, which has a standard normal distribution, will be as follows.

$$t = \frac{\hat{p}_\alpha - p_\alpha}{\hat{\sigma}_p} \tag{8}$$

Finally, at the error level of 5%, the confidence interval is calculated as follows.

$$\hat{p}_\alpha - t_{\%5}\hat{\sigma} \le p_\alpha \le \hat{p}_\alpha + t_{\%5}\hat{\sigma} \tag{9}$$

Taking into account the two independent samples with sizes of n1 and n2 and asymptotic distributions $\sqrt{n_i}(\hat{p}_i - p_i)$ with the variance σ_i^2, i = 1,2 and removing α in the pα index, the standard deviation of $(\hat{p}_1 - \hat{p}_2)$ is as follows.

$$SE(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{\hat{\sigma}_1^2}{n_1} + \frac{\hat{\sigma}_2^2}{n_2}} \tag{10}$$

3. Estimation and analysis

Table (1), shows the results of Gini coefficient decomposition for the self-employed and wage and salary earners. According to the results, in the years before and after targeted subsidies (fourth and fifth development plans), the inequality rate has decreased for both occupational groups in both urban and rural areas. In terms of the shares of total inequality, in both areas the targeted subsidies have also led to an increase in the share of wage and salary, and a decrease in the share of self-employed.

Table(1): Gini decomposition

Plan	Year	Region	Gini coefficient value			The absolute and relative contribution of total inequality (The numbers in brackets are a relative contribution in percentages)			
						intragroup			Intergroup
			Total	Wage and salary earners	Self-employed	Total	Wage and salary earners	Self-employed	
Forth plan	2006	Urban	0.40	0.40	0.41	0.21 (51)	0.13 (33)	0.07 (18)	0.008 (1.9)
		Rural	0.39	0.39	0.38	0.19 (50)	0.11 (30)	0.08 (21)	0.01 (2.8)
	2010	Urban	0.39	0.40	0.38	0.20 (53)	0.15 (38)	0.06 (15)	0.004 (1)
		Rural	0.38	0.39	0.37	0.19 (50)	0.09 (23)	0.10 (27)	0.03 (6.7)
Fifth plan	2012	Urban	0.34	0.35	0.34	0.18 (53)	0.13 (39)	0.05 (14)	0.007 (2)
		Rural	0.33	0.34	0.33	0.17 (50)	0.08 (24)	0.09 (26)	0.02 (7.5)
	2017	Urban	0.35	0.36	0.35	0.19 (54)	0.15 (42)	0.04 (12)	0.002 (0.5)
		Rural	0.32	0.32	0.32	0.16 (50)	0.09 (27)	0.07 (23)	0.03 (9.2)

Source: Research findings

The results presented in Table 1 are based on point estimators, while the results of the Gini coefficient difference based on the statistical confidence interval, as shown in Table (2), show that during the fourth plan, there has been a significant decrease only in inequality among urban self-employment jobs. In the years after the targeted subsidies (Fifth plan), for both types of occupations inequalities have decreased in rural areas, but in urban areas, inequalities have increased among wage and salary earners, and there is no significant change for the self-employed.

Table(2): difference in the Gini coefficient

Plan	Description	Difference in the Gini	Prob
Forth plan 2006-2010	Rural wage and salary earners	$\text{gini}_{88} - \text{gini}_{84} = -0.002$	0.782
	Rural self-employed	$\text{gini}_{88} - \text{gini}_{84} = -0.009$	0.174
	Urban wage and salary earners	$\text{gini}_{88} - \text{gini}_{84} = -0.003$	0.499
	Urban self-employed	$\text{gini}_{88} - \text{gini}_{84} = -0.031$	0.000
Fifth plan 202-2017	Rural wage and salary earners	$\text{gini}_{95} - \text{gini}_{90} = -0.016$	0.000
	Rural self-employed	$\text{gini}_{95} - \text{gini}_{90} = -0.009$	0.071
	Urban wage and salary earners	$\text{gini}_{95} - \text{gini}_{90} = 0.009$	0.061
	Urban self-employed	$\text{gini}_{95} - \text{gini}_{90} = 0.010$	0.139

Source: Research findings

According to the results, judgments based on the absolute values of the Gini coefficient index and the results of the statistical confidence interval yield two different results

According to the results of the head count Poverty Index decomposition in Table (3), the value of poverty declined in the years after the targeted subsidies

law enforcement. But the investigation of the share of the self-employed and wage and salary earners from total rural and urban poverty shows that during the fourth plan, the share of salaried employees from total poverty increased in urban areas but declined in rural areas, but this was not true about the self-employment jobs. During the fifth plan, however, the share of salaried employees from total poverty was fixed in urban areas but increased in rural areas.

Table(3): Head count Poverty Index decomposition

Plan	Year	Region	Head count Poverty value			The absolute and relative contribution of total poverty (The numbers in brackets are relative shares in percentages)		
			Total	wage and salary earners	self-employed	total	wage and salary earners	self-employed
Forth plan 2006-2010	2006	Urban	0.32	0.33	0.31	0.32 (100)	0.19 (59)	0.13 (41)
		Rural	0.53	0.55	0.51	0.53 (100)	0.30 (56)	0.23 (44)
	2010	Urban	0.38	0.40	0.36	0.38 (100)	0.24 (63)	0.14 (37)
		Rural	0.62	0.65	0.59	0.62 (100)	0.32 (52)	0.30 (48)
Fifth plan 202-2017	2012	Urban	0.31	0.32	0.29	0.31 (100)	0.20 (65)	0.11 (35)
		Rural	0.47	0.51	0.43	0.47 (100)	0.26 (54)	0.22 (46)
	2017	Urban	0.36	0.37	0.36	0.36 (100)	0.24 (65)	0.13 (35)
		Rural	0.52	0.55	0.47	0.52 (100)	0.30 (57)	0.22 (43)

Source: Research findings

Table(4): Head count Poverty Index difference

Plan	Description	Difference in the poverty	Prob
Forth plan 2006-2010	Rural wage and salary earners	$PH_{88} - PH_{84} = 0.108$	0.088
	Rural self-employed	$PH_{88} - PH_{84} = 0.097$	0.000
	Urban wage and salary earners	$PH_{88} - PH_{84} = 0.068$	0.000
	Urban self-employed	$PH_{88} - PH_{84} = 0.045$	0.001
Fifth plan 202-2017	Rural wage and salary earners	$PH_{95} - PH_{90} = 0.045$	0.000
	Rural self-employed	$PH_{95} - PH_{90} = 0.040$	0.000
	Urban wage and salary earners	$PH_{95} - PH_{90} = 0.044$	0.000
	Urban self-employed	$PH_{95} - PH_{90} = 0.072$	0.000

Source: Research findings

In order to examine more precisely changes in poverty, the results of the difference in poverty are presented in Table 4. As shown in the table, after the targeted subsidy law enforcement in both areas, the poverty rate has significantly increased for both occupational groups. The results of analysis related poverty show that, as in the case of inequality, judgments based on the absolute values and the results of the statistical confidence interval yielded two different results.

4. Conclusion

The result of this study show that, in investigating the effect of Iran's targeted subsidies on the rate of inequality and poverty, judgments based on the absolute values and the results of statistical confidence interval produce two different results. According to the absolute values of indices, the status of inequality and poverty has improved, but based on the results of difference in indices, for both occupations inequalities have decreased in rural areas, but increased in urban areas among wage and salary earners, and there is no significant change for the self-employed. About poverty, the results of statistical tests indicated that status of poverty is worsening for all occupational groups. Accordingly, judgments about the effects of policies based on comparisons of absolute values of indices or based on the total status of population or urban and rural areas are not enough for correct policy-making.

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