African Journal of Agricultural Research Vol. 6(2), pp. 382-391, 18 January, 2011
Available online at http://www.academicjournals.org/AJAR
ISSN 1991-637X ©2011 Academic Journals

Full Length Research Paper

Investigating the effects of targeting subsidies on macroeconomics variables of agricultural sector in Iran

Seyed-Ali Hosseini-Yekani

Department of Agricultural Economics, Sari Agricultural Sciences and Natural Resources University, Sari, Iran.
E-mail: hosseiniyekani@gmail.com.

Accepted 14 December, 2010

The aim of this study is simulating the results of targeting subsidies on macroeconomics variables of agricultural sector in Iran. In order to achieving the objectives of this study, a multi-sector computable general equilibrium model with five quintiles of rural and urban households is developed to analyze the results of elimination and redistribution of subsidies according to the law of targeting subsidies in Iran. The results show that during targeting, high income and average income groups lose. Income rising (in the case of quintiles which their income rise) causes to increasing demand of agricultural products, food products and services in both urban and rural households. The level of factor demand in agricultural and food industrial sectors increases. Income of unskilled labors increase more than income of skilled labors. The produced commodities of petroleum, industrial and mineral sectors will be expensive and the other commodities will be cheap. The level of production in agricultural and food industrial sectors increase and in the other sectors decrease. Agricultural, food industrial and services exports rise and petroleum, industrial and mineral exports reduce. Agricultural imports increase and the level of imports in other sectors decrease.

Key words: Targeting subsidy, computable general equilibrium, agriculture, Iran.

INTRODUCTION

Public support in Iran dates back to Safavid era. These supports began with tax discounts and continued with implementing agricultural development systems during Ghajar era (Rahimi, 1996). But direct government interventions in supply and demand in Iran began through passing a law about the wheat purchasing and storing by Cereal Organization since 1932 (Najafi, 1997). In this connection, the subsidy with the aim of supporting destitute groups was popular from about 1920. But the current form of subsidy began from early 1970's in Iran. While the subsidy as one of the major government instruments in both developing and developed countries is used for redistribution of income and support of destitute groups, Iranian governments began to pay subsidies to the public since 1970's, relying on rich oil revenues and following social welfare systems of developed countries. From then on annual payment of subsidies enjoyed an ascending trend (Permeh, 2005; Permeh and Heydari, 2006).

Existence of 10 to 20 % of Iranian households in need of standard calories is a clear reason to continue subsidizing the food supply with the aim of satisfying the food security in Iran. But intervention in market mechanisms through food subsidies imposes huge expenses to government and reduces the market efficiency. Also non-targeted subsidy payments seriously undermine the efficiency of this supporting policy in realizing social justice goals (Khodadad-kashi and Heydari, 2004). In the other word, despite the high share of subsidies in Iranian government budget, this policy has limited efficiency in reducing poverty because of public distribution of subsidies (Dini-torkamani, 1996).

According to World Bank studies in this area, Iranian subsidy system is in a way that rich groups enjoy higher subsidies. In a general conclusion, disadvantages of public subsidy regime in Iran can be expressed as: (a) Absolute costs of subsidy payment in this system is much more than benefits that reach the poor groups. (b) Distribution of subsidies in this framework is unfair. (c) The high share of subsidies is out of distribution system as leakages. (d) Amount of waste products subject to subsidy protection (especially bread) increases in this

system. (e) Following the creation of gap between government and free rates in this system, smuggling market will expand. (Najafi and Shoushtarian, 2004). Considering these factors clears more and more the necessity of acts in order to targeting the subsidies. Needless to say that targeted subsidies would be appropriate only if have the lowest cost for government, the highest rate of poor coverage, the lowest leakage rate of rich people and the lowest administrative and political costs. As regards targeting subsidies is on the agenda of Iranian government planning, investigating the effects of this policy on macroeconomics variables can be beneficial to help decision makers in selecting the preventive and complementary policies. In the meantime, agricultural sector and rural areas are parts that heavily impressed from removing and targeting the subsidies. Because on one hand the bulk of poor lives in rural areas and on the other hand the job of much of them is agriculture. Plenty of researches have been done in the field of agricultural and food subsidies in Iran.

Farajzadeh and Najafi (2004) studied the effect of food subsidy reduction on Iranian consumers. In their study, impact of increasing price of the subsidized commodities on calorie intakes, income of deciles and poverty indices was investigated by using different scenarios of price increment. Based on the results, they suggested that income deciles in both rural and urban regions to be recognized and subsidized commodities to be distributed among the deciles located under poverty line. However, in case of reduction in subsidies, results of this study suggested that it should take place by selected commodities and gradually.

Akbari Moghaddam and Piraei (2005) investigated the consequences of the both decreasing the agricultural sector subsidy, and the changes of the labor tax, on the sectoral production and revenue of urban and rural households. The results of their study revealed that the reduction of agricultural sector subsidy will have a negative impact on the production of all other sectors. However, for agriculture sector the percentage of this negative impact was more significant than other sectors, also its negative impact on the urban and rural revenue was considerable.

Heydari et al. (2007) used vector autoregressive method for investigating relationship between per capita calorie intake, food subsidy, income and food prices in Iran, using annual data for 1961 to 2004. On the basis of Augmented Dicky Fuller unit root test they found that all variables have only one unit root. For determining the number of long-run relationships between the variables, they used trace statistics. On the basis of this statistics they only found one long-run relationship (co-integration) between variables. The long run relationship was only significant between calorie intake, income and food subsidy variables. The results of their study showed that one unit reduction in food subsidy without income compensation has a considerable negative effect on calorie intake in short-run and that it takes around five years for households to adjust themselves to the new condition. But, if one standard error food subsidy reduction occurs with the same amount of income compensation, then the effect of income compensation not only removes the negative effects of subsidy reduction, but also will have positive effect on calorie intake in short-run and long-run. Finally, they conclude that focus on food subsidy reduction without considering income growth will deteriorate Iranian household calorie intake.

Karami et al. (2009) investigated distribution of benefits of current subsidy system in Iran by emphasizing on bread, oil and sugar. The results of their study based on 2001 statistics indicated that benefits of bread subsidy in rural and urban areas in all provinces and also among different groups are more than oil and sugar. Also results showed that current system of subsidy is biased toward higher income groups. Based on findings of the study, they recommended targeting of food subsidies to lessen these problems and decrease in government costs.

Salami and Saraei-Shad (2010) studied the effects of removal of fuel subsidy on wheat price in Iran. In this study, first, Aggregate Measure of Support (AMS) was computed and the share of fuel in AMS was specified. Then, a restricted translog cost function was estimated, using data over period 1987 to 2006. Finally, the effect of elimination of subsidy on unit cost of irrigated wheat was computed using irrigation water and machinery cost elasticity derived from the estimated parameters of cost function. Results of their study indicated that fuel constitutes the largest share of AMS so that in 2005, this share accounted for 83% of calculated AMS. Also, results revealed that overall elimination of fuel subsidy would result in an increase of 438.98 Rials, equivalent to 26% in price of wheat in Iran. This result suggested that decision on removing fuel subsidy must be taken with caution and gradually.

According to importance of subsidy and its related problems, many other studies have been done in Iran. For example; Sabouhi (2001), Permeh and Heydari (2007), Piraei and Shahsavar (2008); Ghaderi and Estedlal (2009).

Obviously targeting subsidies is not an important problem just in Iran. Many researchers from various countries have studied this subjective in different dimensions.

Azzam (1991) described a three-sector supply-demand model, was used to estimate the direct and indirect (induced) effects on government cost of changes in the soft wheat subsidy. The results of his study showed that virtually all the indirect effects come from the soft wheat market itself. The indirect effects emanating from the related markets were negligible.

Dhehibi and Gil (2003) assessed the impact of two alternative schemes of price subsidies management. Food demand forecasts in this study were based on

estimated parameters from an AIDS model together with some assumptions about the exogenous variables and population projections. Results indicated that a gradual subsidies removal will not affect substantially food expenditure structure. Non subsidized food products would increase their relative position while traditional products would lose slightly.

Jensen and Tarr (2003) developed a multi-sector computable general-equilibrium model with ten rural and ten urban households to analyze the various reforms, separately and together. Reflecting the large initial distortions, they found that the combined reforms could generate large welfare gains equal to about 50% of aggregate consumer income. Moreover, the results showed that well-intentioned policies of commodity subsidies for the poor can have perverse effects. Even non-targeted direct income payments to all households (not just the poor) would enormously and progressively increase the incomes of the poor compared to the status quo.

For more information see Lofgren and El-Said (1999), Arndt et al. (2001), Ramaswami and Balakrishnan (2002), Ahmed and Bouis (2002), Coady and Harris (2004), Dutta and Ramaswamii (2004), Kochar (2005), Mane (2006), Afsaw (2007) and Gelan (2007).

According to the law of targeting subsidies in Iran, it has decreed that 50% of released amount has to distribute between different income groups of consumers and 30% of this amount should spend in order to supporting producers and also 20% of this amount has to be placed at governments disposal. Therefore, the simulation results of gradual implementation of this law in five stages are investigated in this study.

MATERIALS AND METHODS

In this study a multi-sector computable general equilibrium (CGE) model with five quintiles of rural and urban households is developed to analyze the results of elimination and redistribution of subsidies according to the law of targeting subsidies in Iran. The basic required data for calibrating the model and simulating different scenarios are achieved from social accounting matrix (SAM) of country. The last version of Iranian SAM (year 2001) is utilized in this study. Parameters, variables and relations in CGE model of current research followed by Lofgren (1999) are as below.

(1) Value added function

$$VA_j = b_j \prod_h FD_{hj}^{\beta_{hj}}$$

(2) Demand function for intermediate factors

$$X_{ij} = ax_{ij}.Y_j$$

(3) Value added demand function

$$VA_j = ay_j.Y_j$$

(4) Factors demand function

$$FD_{hj} = \frac{\beta_{hj}.PN_j(1-sa_j)}{W_h}.VA_j$$

(5) Cost function

$$PS_j = ay_j.PN_j(1-sa_j) + \sum_i ax_{ij}.PQ_i(1-sq_i)$$

(6) Households income

$$YH = \sum_h W_h.FS_h + GOVTH + EXR.REMIT$$

(7) Indirect tax relation

$$ITAX_j = tx_j.PS_j.Y_j$$

(8) Direct tax relation

$$DTAX = td.YH$$

(9) Tariff income relation

$$TARIFF_j = tm_j.PM_j.M_j$$

(10) Subsidy of consumption

$$SC_i = sq_i.PQ_i.Q_i$$

(11) Subsidy of production

$$SP_i = sa_i.PN_i.VA_i$$

(12) Government income

$$GR = DTAX + \sum_j ITAX_j + \sum_j TARIFF_j + (EXR.GIR) - \sum_j (SC_j + SP_j)$$

(13) Private sector consumption

$$C_i.PQ_i.(1-sq_i) = \lambda_{ci}\left(YH - DTAX - HSAV\right)$$

(14) Public sector consumption

$$G_i.PQ_i(1-sq_i) = \lambda_{gi}.GDTOT$$

(15) Investment demand function

$$ID_i.PQ_i(1-sq_i) = \mu_i.INVEST$$

(16) World export price relation

$$PE_i = pwe_i.EXR$$

(17) World import price relation

$$PM_i = pwm_i.EXR$$

(18) Armington CES function

$$Q_i = \gamma_i(\alpha_{mi}.M_i^{\rho_{mi}} + \alpha_{di}.D_i^{\rho_{mi}})^{\frac{1}{\rho_{mi}}}$$

(19) Import demand function

$$M_i = \left(\frac{\gamma_i^{\rho_{mi}}.\alpha_{mi}.(1-sq_i).PQ_i}{(1+tm_i).PM_i}\right)^{\frac{1}{1-\rho_{mi}}}.Q_i$$

(20) Domestic goods demand function

$$D_i = \left(\frac{\gamma_i^{\rho_{mi}}.\alpha_{di}.(1-sq_i).PQ_i}{PD_i}\right)^{\frac{1}{1-\rho_{mi}}}.Q_i$$

(21) Transfer CET function

$$Y_i = \theta_i(\beta_{ei}.E_i^{\rho_{ei}} + \beta_{di}.D_i^{\rho_{ei}})^{\frac{1}{\rho_{ei}}}$$

(22) Export supply function

$$E_i = \left(\frac{\theta_i^{\rho_{ei}}.\beta_{ei}(1+tx_i).PS_i}{PE_i}\right)^{\frac{1}{1-\rho_{ei}}}.Y_i$$

(23) Domestic goods supply function

$$D_i = \left(\frac{\theta_i^{\rho_{ei}}.\beta_{di}.(1+tx_i).PS_i}{PD_i}\right)^{\frac{1}{1-\rho_{ei}}}.Y_i$$

(24) Private sector saving

$$HSAV = s_{hoh}.YH$$

(25) Public sector saving

$$GSAV = s_g.GR$$

(26) Total investment relation

$$SANVING = (HSAV + GSAV + EXR.FSAV)$$

(27) Factor market clearing relation

$$\sum_j FD_{hj} = FS_h$$

(28) Composite goods market clearing relation

$$Q_i = C_i + G_i + ID_i + \sum_j X_{ij}$$

(29) Balance of payments

$$\sum_i pwe_i.E_i + FSAV + REMIT + GIR = \sum_i pwm_i.M_i$$

(30) Investment-Saving equality

$$SAVING = INVEST$$

(31) Price normalize relation

$$PINDEX = \sum_i \omega_i PQ_i(1-sq_i)$$

Endogenous variables inside the above relation are as following:

1.	Value added	VA_j
2.	Value added price	PN_j
3.	Factor price	W_h
4.	Factor demand	FD_{hj}
5.	Supply price	PS_j
6.	Gross output	Y_j
7.	Composite good price	PQ_i
8.	Intermediate factor	X_{ij}
9.	Households consumption	C_i
10.	Household income	YH
11.	Direct tax	$DTAX_r$
12.	Households saving	$HSAV$
13.	Indirect tax	$ITAX_j$
14.	Total subsidy of consumption	SC_i
15.	Total subsidy of production	SP_i
16.	Tariff income	$TARIFF_j$
17.	Import domestic price	PM_j
18.	Import	M_j
19.	Government expenditures	G_i
20.	Government income	GR
21.	Government saving	$GSAV$
22.	Investment demand	ID_i
23.	Total investment	$INVEST$
24.	Export domestic price	PE_i
25.	Exchange rate	EXR
26.	Composite good	Q_i
27.	Domestic good	D_i
28.	Price of domestic good	PD_i
29.	Export	E_i
30.	Government foreign income	GIR
31.	Total saving	$SANVING$

Exogenous variables of model are as following:

1.	Foreign saving	$FSAV$
2.	Import world price	pwm_i
3.	Export world price	pwe_i
4.	Factor supply	FS_h
5.	Government consumption	$GDTOT$
6.	Transfer payment from government to households	$GOVTH$
7.	Net rest of the world payments	$REMIT$
8.	Price index	$PINDEX$

Finally, parameters of model are:

1.	Efficiency parameter in production function	b_j
2.	Share parameter in production function	β_{hj}

Table 1. Effects of gradual targeting subsidies on consumption expenditure

	Urban households					Rural households				
	First quintile	**Second quintile**	**Third quintile**	**Fourth quintile**	**Last quintile**	**First quintile**	**Second quintile**	**Third quintile**	**Fourth quintile**	**Last quintile**
First stage	2.231	0.634	0.050	-0.577	-1.132	5.189	3.168	2.158	1.160	0.102
Second stage	2.005	0.453	-0.133	-0.784	-1.347	4.836	2.951	1.973	1.000	-0.048
Third stage	1.778	0.261	-0.331	-1.012	-1.588	4.515	2.742	1.788	0.834	-0.208
Fourth stage	1.516	0.023	-0.581	-1.304	-1.896	4.202	2.517	1.577	0.634	-0.410
Fifth stage	1.150	-0.335	-0.962	-1.750	-2.367	3.862	2.233	1.287	0.343	-0.714

3.	Input parameter of Leontief production function	ax_{ij}
4.	Output parameter of Leontief production function	ay_j
5.	Share parameter in utility function	λ_{ci}
6.	Consumption subsidy rate	sq_i
7.	Production subsidy rate	sa_i
8.	Indirect tax rate	tx_j
9.	Direct tax rate	td
10.	Tariff rate	tm_j
11.	Share parameter of government	$\lambda_{g\,i}$
12.	Share parameter of investment	μ_i
13.	Share parameter in Armington function	$\alpha_{mi}\ \alpha_{di}$
14.	Substitution elasticity parameter	ρ_{mi}
15.	Efficiency parameter in CET function	θ_i
16.	Share parameter in CET function	$\beta_{ei}\ \beta_{di}$
17.	Transfer elasticity parameter	ρ_{ei}
18.	Average propensity to saving of private sector	s_{hoh}
19.	Average propensity to saving of public sector	s_g
20.	Weight of prices	ω_i

RESULTS AND DISCUSSION

In order to investigating the results of targeting subsidies in Iran and according to the law of targeting subsidies, it assumes that 50% of released subsidies is distributed equally between different income groups of consumers and 30% of this amount is divided between various production sectors based on their share of subsidies before targeting. Also, it assumes that, this targeting is done gradually in five stages. The PATH solver in the GAMS environment was employed for this simulation and solving the described model in the previous section.

According to the results of Table 1 elimination of subsidies and its redistribution has negative effects on consumption expenditures of some of quintiles and positive effects on some others.

In urban households, elimination and redistribution of subsidies is increased consumption expenditures of the first quintile of households in all stages. It also is increased consumption expenditures of the second quintile during the first to fourth stages. But on third quintile, it is increased consumption expenditures just in the first stage. Targeting subsidies has a negative effect in the other stages and other quintiles. Declining trend of consumption expenditures is increased by increasing the income level of households.

In rural households, elimination and redistribution of subsidies is increased consumption expenditures of all quintiles, but just during the second to the last stages of targeting in the fifth quintiles, consumption expenditures decrease. So that the consumption expenditures of the first quintile of rural households increase about 22% and consumption expenditures of the fifth quintile of these households decrease about 1.2%.

As it is indicated in Table 2, capital factor income (demand) decreases 16%, after targeting subsidies. Also income (demand) of skilled labor in private sector, skilled labor in public sector, unskilled labor in private sector and unskilled labor in public sector decrease respectively about 26, 17, 36 and 21%.

According to the relation (12), government expenditures include government consumption expenditure, transfer payments to households and institutions and transfer to rest of the world. Government incomes also include direct tax, transfer from rest of the world, sale tax, tariff and export tax (Relation (10)).

Table 3 shows that, with elimination and redistribution of subsidies, government expenditures decrease about 7% and government incomes increase about 3%.

Prices of farming, animal and food products decrease about 30%, 10% and 15% respectively after targeting subsidies. But prices of petroleum, industrial and mineral products increase about 35%, while prices of services almost remain unchanged. According to the results of Table 4, in the first stage of elimination and redistribution of subsidies, prices of farming, animal and food products

Table 2. Effects of gradual targeting subsidies on factors income (demand).

		Urban labor				Rural labor			
		Skilled		Unskilled		Skilled		Unskilled	
	Capital	Private sector	Public sector	Private sector	Public sector	Private sector	Public sector	Private sector	Public sector
First stag	-2.541	-3.371	-2.673	-5.235	-3.014	-2.619	-2.836	-5.403	-3.117
Second stage	-2.873	-3.807	-2.982	-5.976	-3.369	-3.001	-3.173	-6.186	-3.488
Third stage	-3.250	-4.325	-3.342	-6.900	-3.788	-3.438	-3.569	-7.163	-3.926
Fourth stage	-3.732	-5.006	-3.812	-8.147	-4.336	-4.002	-4.085	-8.486	-4.501
Fifth stage	-4.461	-6.028	-4.526	-10.028	-5.161	-4.854	-4.866	-10.486	-5.364

Table 3. Effects of gradual targeting subsidies on factors income (demand).

	Government expenditures	Government incomes
First stage	-1.182	0.907
Second stage	-1.275	0.814
Third stage	-1.398	0.665
Fourth stage	-1.574	0.455
Fifth stage	-1.859	0.159

Table 4. Effects of gradual targeting subsidies on price levels.

	First stage	Second stage	Third stage	Fourth stage	Fifth stage
Farming	-5.69	-5.73	-5.84	-6.04	-6.4
Livestock	-1.86	-1.97	-2.12	-2.34	-2.68
Food industry	-2.96	-2.97	-3.03	-3.12	-3.29
Petroleum, Industry and Mines	6.8	6.63	6.58	6.7	7.12
Services	0.54	0.23	-0.11	-0.51	-1.1

decrease respectively about 6, 2 and 3% and prices of petroleum, industrial and mineral products increase about 7%. However prices of services increase about 0.5% in this stage.

Production in farming, livestock and food industry sectors increase respectively about 32, 15 and 14% respectively after targeting, but production in oil, industry and mining sector reduce about 29%. At the same time, production in services sector decrease about 1.5% (Table 5).

Research findings at Table 6 show that elimination and redistribution of subsidies will increase export from farming, livestock, food industry and services sectors about 22, 9, 13 and 1.5%, respectively in the first stage, while will decrease petroleum, industrial and mineral exports almost 6%. These increase and decrease in the mentioned sectors will continue with a mild rising trend.

As it is indicated in Table 7, agricultural imports (farming and animal commodities imports) will increase about 5% after targeting, while imports in the other sectors will decrease. These reductions will be about 4% in food products, 25% in petroleum, industrial and mineral products and 6% in services. Of course, imported effects of targeting subsidies in the first stage are low. So that, except for petroleum, industrial and mineral imports (which show about 3% reduction), these percentages are about or less than only 1%.

According to the results of Table 8, elimination and redistribution of subsidies causes to rise demand for agricultural, food industrial and services products in the first and second quintiles. It also causes to reduce demand for petroleum, industrial and mineral products in these quintiles at the same time. In the third to fifth quintiles, demand for agricultural and food industrial

Table 5. Effects of gradual targeting subsidies on production levels.

	First stage	Second stage	Third stage	Fourth stage	Fifth stage
Farming	6.36	6.35	6.42	6.59	6.88
Livestock	3.03	3.01	3.02	3.07	3.13
Food industry	3.25	3.08	2.93	2.77	2.52
Petroleum, Industry and Mines	-3.54	-4.37	-5.42	-6.85	-9.03
Services	-0.31	-0.3	-0.3	-0.31	-0.33

Table 6. Effects of gradual targeting subsidies on export levels.

	First stage	Second stage	Third stage	Fourth stage	Fifth stage
Farming	22.09	22.35	22.89	23.85	25.58
Livestock	8.61	8.87	9.26	9.84	10.76
Food industry	13.4	13.47	13.7	14.13	14.87
Petroleum, Industry and Mines	-6.36	-6.95	-7.86	-9.26	-11.54
Services	1.48	1.84	2.22	2.68	3.34

Table 7. Effects of gradual targeting subsidies on import levels.

	First stage	Second stage	Third stage	Fourth stage	Fifth stage
Farming	1.35	1.26	1.2	1.14	1.02
Livestock	1.15	1.03	0.92	0.8	0.59
Food industry	-0.09	-0.33	-0.6	-0.94	-1.48
Petroleum, Industry and Mines	-2.53	-3.45	-4.55	-5.99	-8.13
Services	-0.93	-1.04	-1.17	-1.33	-1.58

Table 8. Effects of gradual targeting subsidies on demand of urban households.

	First stage	Second stage	Third stage	Fourth stage	Fifth stage
First quintile					
Farming	8.67	8.45	8.3	8.22	8.2
Livestock	4.43	4.29	4.19	4.12	4.06
Food industry	5.61	5.37	5.16	4.96	4.72
Petroleum, Industry and Mines	-4.03	-4.12	-4.32	-4.71	-5.46
Services	1.94	2	2.09	2.21	2.4
Second quintile					
Farming	6.8	6.63	6.52	6.45	6.43
Livestock	2.63	2.54	2.47	2.42	2.36
Food industry	3.8	3.6	3.43	3.25	3.01
Petroleum, Industry and Mines	-5.68	-5.73	-5.9	-6.26	-7.01
Services	0.18	0.29	0.41	0.54	0.72
Third quintile					
Farming	6.09	5.92	5.79	5.71	5.64
Livestock	1.95	1.85	1.77	1.7	1.6
Food industry	3.11	2.9	2.72	2.53	2.24
Petroleum, Industry and Mines	-6.31	-6.36	-6.54	-6.92	-7.7
Services	-0.48	-0.38	-0.28	-0.16	-0.03

Table 8. Continued.

	Fourth quintile				
Farming	5.28	5.06	4.88	4.72	4.54
Livestock	1.17	1.03	0.9	0.75	0.54
Food industry	2.32	2.08	1.84	1.57	1.18
Petroleum, Industry and Mines	-7.03	-7.12	-7.34	-7.78	-8.66
Services	-1.24	-1.18	-1.13	-1.09	-1.07
	Last quintile				
Farming	4.17	3.86	3.56	3.23	2.79
Livestock	0.11	-0.13	-0.38	-0.68	-1.14
Food industry	1.24	0.9	0.55	0.13	-0.52
Petroleum, Industry and Mines	-8	-8.19	-8.51	-9.1	-10.19
Services	-2.28	-2.32	-2.39	-2.5	-2.73

products increase and for petroleum, industrial and mineral products and also for services decrease. The amount of demand rising decreases with the households income level increases and the amount of demand reducing for goods increases with the income increases. Also during stages of targeting subsidies, amount of demand for goods with rising demand decreases and for goods with reducing demand increases.

Demand situation after targeting subsidies for rural households is such that in the first to fourth quintiles the amount of demand for farming products, animal products, food products and services rises and for petroleum, industrial and mineral products reduces (Table 9). This situation for the fifth quintile is as the same as other quintiles except that demand for services decreases. In the case of rural households again, amount of demand rising decreases with the households income level increases and the amount of demand reduction for goods increases with the income increases. This trend continues throughout the targeting stages. The amount of demand rising for goods with increasing demand in rural households is more than urban households and the amount of demand reduction for goods with decreasing demand is less than urban households.

Conclusion

In this paper, the effects of elimination and redistribution of subsidies according to the law of targeting subsidies in Iran are investigated in a CGE framework. According to the results of this study during targeting: (a) High income and average income groups lose. (b) Income rising (in the case of quintiles which their income rise) causes to increasing demand of agricultural products, food products and services in both urban and rural households.
(c) The level of factor demand in agricultural and food industrial sectors increases.
(d) Income of unskilled labors increase more than income of skilled labors.
(e) The produced commodities of petroleum, industrial and mineral sectors will be expensive and the other commodities will be cheap.
(f) The level of production in agricultural and food industrial sectors increase and in the other sectors decrease.
(g) Agricultural, food industrial and services exports rise and petroleum, industrial and mineral exports reduce.
(h) Agricultural imports increase and the level of imports in other sectors decrease.

Recommendations

(a) According to the changing income status after targeting, it recommends that average income urban group should be considered more in redistribution of subsidies.
(b) The rising trend of income reductions and subtractive process of income increasing, during the simulated redistribution of subsidies shows an autoregulating mechanism. Therefore, it recommends that policy makers have to avoid suddenly elimination of subsidies.
(c) According to the results of this study based on stimulating the agricultural and food industrial demand during the targeting, governments have to seriously care about the market conditions of these products.
(d) Results show that agricultural sector is the most affecting sector from elimination of production subsidies comparing to the other sectors. In the other word, elimination of production subsidies has negative effects on macro economics variables of agricultural sector. Then, it recommends that targeting of production subsidies especially in the case of water subsidies must perform very cautiously.

Table 9. Effects of gradual targeting subsidies on demand of rural households.

	First stage	Second stage	Third stage	Fourth stage	Fifth stage
First quintile					
Farming	13.65	13.05	12.61	12.32	12.21
Livestock	9.21	8.71	8.33	8.06	7.91
Food industry	10.45	9.84	9.34	8.94	8.6
Petroleum, Industry and Mines	0.36	-0.06	-0.51	-1.09	-1.96
Services	6.61	6.33	6.15	6.08	6.19
Second quintile					
Farming	10.57	10.26	10.06	9.94	9.95
Livestock	6.25	6.03	5.88	5.78	5.74
Food industry	7.46	7.13	6.86	6.64	6.41
Petroleum, Industry and Mines	-2.36	-2.52	-2.77	-3.19	-3.93
Services	3.72	3.71	3.74	3.84	4.05
Third quintile					
Farming	9.3	9.04	8.87	8.77	8.75
Livestock	5.03	4.86	4.73	4.65	4.58
Food industry	6.22	5.94	5.71	5.5	5.25
Petroleum, Industry and Mines	-3.48	-3.6	-3.82	-4.22	-4.98
Services	2.53	2.56	2.62	2.73	2.91
Fourth quintile					
Farming	7.89	7.68	7.53	7.44	7.39
Livestock	3.68	3.55	3.45	3.36	3.28
Food industry	4.86	4.62	4.41	4.2	3.93
Petroleum, Industry and Mines	-4.72	-4.8	-5	-5.39	-6.17
Services	1.21	1.28	1.36	1.47	1.62
Last quintile					
Farming	6.23	5.99	5.8	5.63	5.45
Livestock	2.08	1.92	1.78	1.63	1.41
Food industry	3.24	2.97	2.73	2.46	2.06
Petroleum, Industry and Mines	-6.19	-6.3	-6.53	-6.98	-7.86
Services	-0.36	-0.31	-0.27	-0.23	-0.21

ACKNOWLEDGEMENT

This paper is written according to the results of a project in Agricultural Planning and Economics Research Institute. Author thanks the managers and experts of this institute for their supports.

REFERENCES

Ahmed AU, Bouis HE (2002). Weighing what's practical: Proxy means tests for targeting food subsidies in Egypt. Food Policy, 27: 519-540.

Akbary Moghaddam B, Piraei Kh (2005). The effect of subsidy reduction in agriculture sector and the changes in labor tax on sectoral production and the revenues of urban and rural household in Iran. Iranian Econ. Res., 7(22): 1-30.

Asfaw A (2007). Do government food price polices affect the prevalence of obesity? Empirical evidence from Egypt. World Dev., 35(4): 687-701.

Arndt C, Robinson S, Tarp F (2001). Parameter estimation for a computable general equilibrium model: A maximum entropy approach. Discussion Paper No: 40. IFPRI, Washington. D.C.

Azzam AM (1991). Food subsidies and market interdependence: The case of the Moroccan soft wheat subsidy. Agric. Econ. 5(4): 325-229.

Coady DP, Harris RL (2004). Evaluating targeted cash transfer programs: A general equilibrium framework with an application to Mexico. International Food Policy Research Institute. Washington, D.C.

Dhehibi B, Gil JM (2003). Forecasting food demand in Tunisia under alternative pricing policies. Food Policy, 28: 167-186.

Dutta B, Ramaswamii B (2004). Reforming food subsidy schemes: estimating the gains from self-targeting in India. Rev. Dev. Econ., 8: 309-324.

Farajzedah Z, Najafi B (2004). Effect of food subsidy reduction on Iranian consumers. Iranian Econ. Res., 6(20): 135-156.

Gelan AU (2007). Does food aid have disincentive effects on local production? A general equilibrium perspective on food aid in Ethiopia. Food Policy, 32: 436-458.

Ghaderi J, Estedlal S (2009). The effect of electricity price increase on net welfare of different income groups in Iran: 1967-2004. Econ. Res., 9(1): 101-120.

Heydari KH, Kavand H, Permeh Z (2007). Impact of the food subsidy reduction on Iranian household calorie intake. Social Welfare, 6(24): 159-175.

Jensen J, Tarr D (2003). Trade, Exchange rate, and energy pricing reform in Iran: Potentially large effects and gains to the poor. Rev. Dev. Econ., 7(4): 543-562.

Karami A, Esmaeili A, Najafi B (2009). Benefit distribution of food subsidy in Iran. Iranian J. Agric. Econ., 3(1): 159-180.

Kochar A (2005). Can targeted food programs improve nutrition? An empirical analysis of India's public distribution system. Econ. Dev. Cult. Change, 54(1): 203-235.
Lofgren H (1999). Trade reform and the poor in Morocco: A rural-urban general equilibrium analysis of reduced protection, Trade and Macroeconomics Discussion Paper No. 38. International Food Policy Research Institute (IFPRI). Washington. D.C.
Lofgren H, El-Said M (1999). A general equilibrium analysis of alternative scenarios for food subsidy reform in Egypt. International Food Policy Research Institute. Washington. D.C.
Mane RP (2006). Targeting the poor or poor targeting: A case for strengthening the public distribution system of India. J. Asian Afr. Stud., 41(4): 299-317.
Permeh Z, Heydari KH (2007). Identifying poor families and non poor families for targeting subsidies in Iran by employing proxy means test. Iranian J. Trade Stud., 11(41): 1-26.
Piraei Kh, Shahsavar MR (2008). Assessing subsidies and indirect taxes from social welfare aspect in Iran. Nameh-ye-Mofid, 14(1): 119-148.
Ramaswami B, Balakrishnan P (2002). Food prices and the efficiency of public intervention: The case of the public distribution system in India. Food Policy, 27: 419-436.
Sabouhi YA (2001). An evaluation of the impact of reducing energy subsidies on living expenses of households. Energy Policy, 29(3): 245-252.
Salami HA, Saraei-Shad Z (2010). Effects of removal of fuel subsidy on wheat price in Iran. J. Agric. Econ. Res., 2(2): 61-71.