A New Approach to Compare the Impact of Direct and Indirect Payments on Regional Macroeconomic Indices

Nooraddin Sharify*

Abstract

Several procedures have been employed to examine the impacts of subsidies on different indices in an economy. This paper proposes a new approach enabling one to compare direct and indirect payments on households. To this end, the impact of government payments is examined on Gross Regional Products, Employment, Income Distribution and Inflation of Golestan Province in Iran through a Social Accounting Matrix for the year 1993-94. The advantage of this approach is its ability to compare the impact of direct payments and indirect one on the above indices in more detail. The results indicate that direct payments lead to inflation with more influence on comparison with indirect payments.

Keywords: Social Accounting Matrix, Direct payments, indirect payments, Iran, Golestan Province.

1- Introduction

Governmental subsidies that are generally paid indirectly aim to protect the low-income group welfare through preventing the basic needs price increase. Since goods and services are consumed by different income level groups of people, the influence of payments on these goods and services depends on the groups consuming them. So it is expected that different kinds of subsidies are of different influences on inflation, GRP, level of employment and income distribution.

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*- Assistant Professor of Economics Planning, Mazandaran University, Iran. (email: naharify@umz.ac.ir)

Several studies have been carried out in this area. A two sector model was applied by Walsh (1999) to examine the response of trade sector to subsidies through an input-output model to analyse jobs generated in trade sector compared with non-trade sector. A general-equilibrium model was applied by McVittie and Swales (1999) to calculate the effects of subsidies on employment through a regional export base model. DuffyDeno and Robison (1995) also examined the economic impacts of petroleum industry subsidy policy on rural communities in Utah. To this end, an input-output model was applied to quantify the direct and indirect economic and fiscal impacts of a tax credit granted on oil and gas well workovers in Utah's Uintah Basin. An Econometric model was used by Siebe (1995) to examine the medium-term adjustment to tax-subsidy shifts by an econometric model for the Federal Republic of Germany. The UK support of the farmers in disadvantaged area on cash income, job creation and redistribution of payments were evaluated for Northern Ireland using recursive linear programming and input-output model by Caskie *et al.* (2001).

A comparison of the estimated indices suggests a more efficient policy instrument for the government to influence macroeconomic indices of a province. For instance, the Gini coefficient can be employed to explore the impact of a policy on income distribution of a region. Yet the executive problems that are essential in implication of direct payments rather than indirect payments still remain for the related studies.

The present paper examines the impact of different kinds of subsidies on macroeconomic indices. Although, in practice, prices are affected in different ways, this paper focuses on investigating that part of inflation arising from indirect payment elimination. Thus, although the price expectation effects that originate from subsidies elimination on these indices are considerable, they are ignored in this procedure.

It is worth mentioning that this procedure is based on certain assumptions. It is presumed that there is neither compensation nor price expectations for subsidies elimination by producers in different economic sectors. Not having any substitution of goods and services in the households consumption due to changes in the relative prices is one of the important implicit presumptions that is considered in this procedure. Lack of substitution among different kinds of production factors or different items of intermediate consumption in production process is another implicit presumption that is considered, as well. Nevertheless, this procedure enables

one to study the impacts of subsidies elimination in different production sectors on macroeconomic indices separately or cumulatively.

This paper consists of five sections. After a general introduction the Golestan Province SAM framework is generally introduced and the government account is introduced in more detail in the second section. Next, the methodology of the research is introduced through introducing the related tions. The Golestan Province social accounting table for the year 1994 is used to investigate the results of subsidies elimination on the associated indices in the fourth section. And the results of different sections constitute the final section of the paper.

2- Introductory Remarks on the Golestan Province SAM Framework

As a general introduction, the social accounting matrix framework of the Golestan Province as shown in Table 1 consists of seven accounts. Production activities, production factors, households, other institutions, and investment and saving accounts are considered as endogenous sectors whereas government and rest of the world accounts are considered as exogenous ones. The production activities account includes 27 economic sectors. The household account is classified into ten levels based on the disposable income. Other accounts are divided into some sub-sectors so the table totally includes 54 rows and columns[1].

The government account displays its income receive and payments in more detail in a row and a column, respectively. It receives direct taxes and other transfer incomes from production factors including private and public sectors, employees and households, and indirect taxes from production activities sectors. They also pay production and consumption subsidies to producers and consumers. The row summation of their (net) receipts reveals the government net revenue from the region.

In contrast, the column sum of this account displays the government expenditures for the region. They fund education, health and public services sectors as government consumption and payments made to the retired and poor households as different transfer income. The government investment in the region is also considered in the intersection with saving account. The

1- For information in more detail, pleas see (Sharify 2000 and Sharify 2002).

balance of the government income and expenditures in the region is shown in the intersection of the government account row with the rest of the world's account column.

Table 1: The Golestan Province SAM Framework

		Endogenous					Exogenous		Total
		Production Factors	**Production Activities**	**Households**	**Other Institutions**	**Investment**	**Government**	**Rest of the World**	
Endogenous	**Production Factors**	----	Receipt of factor From Domestic Produion	----	----	----	__	Inflow of Factor Payments	Factors Gross Income
	Production Activities	----	Intermediate consumption	Household Consumption	----	Investment	Government Consumption	Export	Total Output
	Households	Household Income Distribution	----	Household Transaction	Household Income Distribution From firms	----	Government Transfers Payment	----	Households Revenue
	Other Institutions and Government	Institutions income Distribution	----	----	----	----	---	----	Institutions Revenue
	Investment & Saving	Saving for Factors	----	Households Saving	Institutions Saving	----	Government Investment	non-saved balance	Total Saving
Exogenous	**Government**	Net Direct Taxes	Net Indirect Taxes	Wealth and Inheritance Tax & Transfers	----	----	----	Net Government Transfers to the region	Government Net Revenue
	Rest of the World	Outflow of Factor Payment	Intermediate Imports	Households Imports	Public Institutions Transfers	Imports for Investment	----	Foreign Imports	Total Outflow
Total		Factors Payments	Total Gross Inputs	Households Expenditures	Institutions Expenditures	Total Investment	Government Expenditures	Total Inflows	----

Indirect taxes are received from consumers. Consumption subsidies are also paid to consumers. The surplus of indirect taxes from these subsidies is recorded as net indirect taxes in the intersection of relevant production activity columns with the government account row. Hence, it is possible to estimate the amount of subsidies in different production activities.

The government also pays households in different ways. The retired receiving retirement pensions are recorded in this part. Other payments to charities such as the Imam Khomini Committee and the Shahid Rejaaee plan, which distribute hand-outs to the poor and old poor farmers, respectively are

also recorded in this part. Thus, the direct payment of the government to households can be recorded in the intersection of the households rows and the government column.

3- Methodology

As mentioned above, the endogenous sector of the model is included in the production activities, production factors, households, other institutions, and investment and saving accounts. Hence, A_n, the direct coefficient matrix that is used like A, the direct coefficient of intermediate consumption of I-O (Paytt and Round 1979), is derived from the transactions between the endogenous part of these accounts. Thus, the share of each sector in endogenous transaction can be displayed.

The intersection of the government row and the production activities columns are recorded as the net indirect taxes, indirect taxes minus subsidies. The ratios of net indirect taxes to total gross inputs of sectors illustrate their shares in total gross inputs. It is expected that any change in subsidy level of a sector leads to affects product expenditures inversely. Hence, elimination the subsidies of a sector will increase the expenditure of that sector.

In other words, since it is assumed that there is no leakage in the economy, increase in the expenditure of a certain level of outputs leads to an appropriate increase in the prices of products. Thus, the intermediate expenditure of the sectors that use these products will increase. The Increment in the intermediate expenditure would lead to an increase in associated sectors products expenditures and prices proportionately. The new increase in product prices will influence a group of products prices similarly, but this increase will converge to a certain level.

Several iterations can be applied to illustrate the subsidies elimination effects on the SAM table. For this purpose, the related row(s) is (are) adjusted through multiplying all items by the ratio of the sector's (s') new total gross inputs to the previous one(s). The result of the adjustment would affect the total gross inputs expenditures of associated sectors through their intermediate expenditures. To investigate the changes on the region economy the former adjustment(s) should be continued over associated sectors. The adjustment(s) should be stopped when the value of gross input expenditures of all sectors tend to approximate a certain amount, or the ratio of total gross inputs of all sectors to their values before any iteration are expected to come

close to 1. Thus, it seems that the direct and indirect effects of subsidies elimination are included in the sectors expenditures.

It is worth mentioning that, since the level of products of the sectors is constant, increase in the gross total input value due to the subsidies elimination leads to increase in price of their products. Because of lity of total gross inputs to corresponding total gross outputs of sectors, dividing the total gross outputs obtained from subsidies elimination adjustment to that of the initial table will reveal the effects of subsidies elimination on the prices of products that can be used as prices indices of the associated sectors. In addition, as addressed in such macroeconomics textbooks as Dornbusch and Fischer (1984), it is also possible to calculate the Producer Price Index (PPI) as one of the inflation indexes of the region through Laspeyres Price Index:

$$I = \sum_{i=1}^{n} Q^{i}_{0} \times P^{i}_{1} \Big/ \sum_{i=1}^{n} Q^{i}_{0} \times P^{i}_{0} = \sum_{i=1}^{n} X^{i}_{1} \Big/ \sum_{i=1}^{n} X^{i}_{0} \qquad (1)$$

where I, Q^{i}_{0}, P^{i}_{0}, P^{i}_{1}, X^{i}_{0} and X^{i}_{1} indicate the inflation index, level of products of sectors, prices of products of the sectors before subsidies elimination, the prices of products of the sectors after subsidies elimination, total gross outputs of the sectors before subsidies elimination, and total gross outputs of the sectors after subsidies elimination, respectively.

Furthermore, the price increases will affect the expenditures of goods and services used as final consumption by households. Dividing the adjusted column summation associated with the households consumption by that of the initial table, the impact of subsidies elimination on goods and services prices which are consumed by different groups of households will be established. Thus, it is possible to study the effect of any indirect payment policy on the households' expenditures increment. Moreover, the inflation index for the households consumption expenditures, the Consumer Price Index (CPI), can also be calculated as addressed in the above macroeconomics textbook:

$$R = \sum_{i=1}^{n} Q^{i}_{0} \times P^{i}_{1} \Big/ \sum_{i=1}^{n} Q^{i}_{0} \times P^{i}_{0} = \sum_{j=37}^{46} \sum_{i=10}^{36} X^{*}_{ij} \Big/ \sum_{j=37}^{46} \sum_{i=10}^{36} X_{ij} \qquad (2)$$

where X_{ij} and X^*_{ij} refer to the consumption of the j^{th} group of households from the i^{th} sectors products before and after subsidies elimination, respectively.

The subsidies elimination adjustment leads to A^*_n, a new endogenous part for technical coefficients matrix, instead of A_n. The A^*_n can be used to study the impact of government transfer payments to the households instead of subsidies.

Based on the essential relationship of SAM:

$$A^*_n X + Y = X \tag{3}$$

where X and Y display row summation of the table and its exogenous part, respectively.

X can be derived:

$$(I - A^*_n)X = Y \Rightarrow X = (I - A^*_n)^{-1}Y \Rightarrow X = M^*_n Y \tag{4}$$

Like the inverse Leontief matrix, M^*_n, a 52- dimension matrix, displays the impact of the exogenous part of the model on the endogenous one. Thus, M^*_n allaws any change on exogenous part of the model to be traced on the X.

To explore the role of M^*_n in the model, we have to decompose it as below:

$$M^* = \begin{bmatrix} m^*_{1,1} & \cdots & m^*_{1,9} & m^*_{1,10} & \cdots & m^*_{1,36} & m^*_{1,37} & \cdots & m^*_{1,46} & \cdots \\ \vdots & & \vdots & \vdots & & \vdots & \vdots & & \vdots & \\ m^*_{9,1} & \cdots & m^*_{9,9} & m^*_{9,10} & \cdots & m^*_{9,36} & m^*_{9,37} & \cdots & m^*_{9,46} & \cdots \\ m^*_{10,1} & \cdots & m^*_{10,9} & m^*_{10,10} & \cdots & m^*_{10,36} & m^*_{10,37} & \cdots & m^*_{10,46} & \cdots \\ \vdots & & \vdots & \vdots & & \vdots & \vdots & & \vdots & \\ m^*_{36,1} & \cdots & m^*_{36,9} & m^*_{36,10} & \cdots & m^*_{36,36} & m^*_{36,37} & \cdots & m^*_{36,46} & \cdots \\ \vdots & & \vdots & \vdots & & \vdots & \vdots & & \vdots & \end{bmatrix} \tag{5}$$

Where m^*_{ij} displays the impact of a unit increase in row j of the table, exogenously on row i summation value. So the rectangular block consists of $m^*_{10,37}$ to $m^*_{36,46}$ denoted as M^{*p} explains the impact of a unit exogenous increase in the households incomes on the total products of sectors through their consumption from production of these sectors of the region. For instance, $m^*_{10,37}$ displays the impact of a unit exogenous increase to the lowest income owner group households income on the first, i. e., farming,

sector total gross outputs in the region. The column summations of these elements explore the impact of a unit exogenous increase in an income group households income on the gross total outputs of the region.

It should be mentioned that to compare the result of direct and indirect payment policies, the sectors production levels should be adjusted by their prices indices. To this end, the division of sectors production level by the relevant prices indices allows one to compare the results of direct and indirect payments by the government to households on the production level of the sectors in a similar price.

The GRP of the region can be divided into two devices. The first device includes the value added of the private or public sectors' production factors generated in the region are examined with relationship (6). The M^{*v1} is a row vector in which M^{*v1}_j concerns the vertical sum of the rectangular block M^{*1} consisting of $m^*_{1,37}$ to $m^*_{9,46}$, in matrix M^*_n that is associated with the production factors income as a result of an exogenous increase in an income-group households income. Thus, $M^{*v1}_j = \sum_{i=1}^{9} m^*_{i,j}$ reveals the impact of a one unit exogenous increase in the j^{th} group household income of the region on the production factors income. Y^* is also a subvector of Y associated with the exogenous households income including Y_{37}, Y_{38}, Y_{39}, …, Y_{46}. Hence, GRP_1 explores changes in the total income generated as a result of responding to the exogenous increase in the households' income of the region:

$$GRP_1 = M^{*v1} \times Y^* = \sum_{i=1}^{9} m^*_{i,37} \times Y_{37} + \sum_{i=1}^{9} m^*_{i,38} \times Y_{38} + \sum_{i=1}^{9} m^*_{i,39} \times Y_{39} \cdots + \sum_{i=1}^{9} m^*_{i,46} \times Y_{46} = M^{*v1}_1 \times Y_{37} + M^{*v1}_2 \times Y_{38} + M^{*v1}_3 \times Y_{39} + \cdots + M^{*v1}_{10} \times Y_{46} \quad (6)$$

The second part of GRP concerns the net indirect taxes received by the government in the region. Denoting GRP_2, this part is recorded as the government income from production activities that is embedded in the exogenous part of the table. Since the net indirect tax depends on the level of the products of production sectors, it can be formulated as fallows with respect to the level of these products:

$$GRP_2 = t \times X^* = t \times M^{*p} \times Y^* \quad (7)$$

where X^* is a column sub vector of X concerning the total products of the sectors including X_{10}, X_{11}, X_{12}, …, X_{36}. Considering the relationship (4), X^* can be decomposed into two devices ($M^{*p} \times Y^*$). In addition, t is the row vector in which t_j refers to the net indirect taxes received from a unit of goods or services produced in the j^{th} production sector.

If:

$$C = t \times M^{*p} \tag{8}$$

Then, GRP_2 can be rewritten as:

$$GRP_2 = C \times Y^* \tag{9}$$

Where C is a row vector, C_1, C_2, C_3… C_{10}, denoting as the total net indirect tax receivable in the region from a unit increase in Y_{37}, Y_{38}, Y_{39}, …, Y_{46}, respectively.

Thus, increase in GRP of the region can be derived from the summation of increase in GRP_1 and GRP_2 that are examined through relationship (10).

$$\begin{aligned} GRP = GRP_1 + GRP_2 &= (M^{*v1}_1 + C_1) \times Y_{37} + (M^{*v1}_2 + C_2) \times Y_{38} + (M^{*v1}_3 + C_3) \times Y_{39} \\ &+ \cdots + (M^{*v1}_{10} + C_{10}) \times Y_{46} = g_1 \times Y_{37} + g_2 \times Y_{38} + g_3 \times Y_{39} + \cdots + g_{10} \times Y_{46} \end{aligned} \tag{10}$$

where G is a row vector in which g_j is the place of $M^{*v1}_j + C_j$.

Like the GRP calculation, by adding an extra row to the SAM table it will be possible to display the required labour force associated with different economic sectors. To this end, let l_j show the size of labour force that is required for a unit product in sector j. Hence:

$$L_j = l_j \times X^*_j \tag{11}$$

were Lj refers to the total labour force employed in sector j. This relationship can be displayed as a matrix form:

$$L = l \times X^* = l \times M^{*p} \times Y^* \tag{12}$$

where l and L are 1×n row vector and a scalar, respectively. Like relationship(7), it is possible to explore the role of a unit increase to households groups income exogenously in labour force employment.

Finally, the Gini Coefficient can be used to illustrate the result of different kinds of government payments policies on income distribution inlity. The revenue of households is obtained by equation(4). To this end, the number of households is required for each income group of households. The size of Gini coefficient is calculated by:

$$GC = 1 - \sum_{i=1}^{n} (X_i + X_{i-1})(p_i + p_{i-1}) \qquad (13)$$

where GC, X_i and p_i refer to the Gini Coefficient size, cumulated proportion of the income variable, for i = 0,..., n, with $X_0 = 0$, $X_n = 1$ and cumulated proportion of the population variable, for i = 0,...,n, with $p_0 = 0$, $p_n = 1$, respectively.

4- Discussion

Golestan Province's SAM for the year 1993/1994 (current price) is used as the initial framework (Sharify, 2000). The interindustry transaction of the SAM has been derived through a semisurvey method using the national input-output table prepared by Central Bank of Islamic Republic of Iran for the year 1988, other parts of the SAM having been completed using a survey approach[1].

Based on the results derived from the SAM, the government paid subsidies for seven sectors products as it is shown in Table 2. The total subsidies, paid for these sectors, consist of more than 7.6% of the total products value of the above sectors. Food Processing Industries, Personal Services including oil products, and Water, Electricity & Gas sectors received the most subsidies that consist of more than 96% of these payments, respectively. It is also worthwhile to pay attention to the share of these subsidies which are 30%, 4.8% and 5.4% of these sectors total products values, in that order.

Table 2: Subsidies and Total Products of the Associated Sectors (1994, Thousand Rials)

1- For information in more detail, pleas see (Sharify 2000 and Sharify 2002).

Sectors	Subsidies	Total Products	Subsidies/ Total Subsidies	Subsidies/ Total Products
Bank & Insurance	301,050	19729630	0.006	0.015
Water, Electricity & Gas	948,190	17403803	0.019	0.054
Personal Services	17,038,971	353302774	0.343	0.048
Food Processing Industries	29,801,605	99460426	0.600	0.300
Public Services	66,373	62658903	0.001	0.001
Health	888,928	23328577	0.018	0.038
Education	663,733	74450517	0.013	0.009
Total Sectors	49,708,850	650,334,630	1	0.076

To study the effects of subsidies elimination from production sectors, the subsidies have been assumed to be eliminated from the related table, separately and totally. The resulting tables have been adjusted with respect to this purpose as mentioned in the previous section. By dividing the column sum of relating the adjusted table's production sectors by that of the similar sector in the initial table, the price indices for these sectors are derived for each case. The PPI and Products Inflation Rate (PIR) have been calculated as inflation indices based on relationship (1) (see Table 3).

Based on table 3 the results of subsidy elimination have different impacts on sectors products prices. It is advisable to pay attention to the factors that can influence the size of these inflation indices. These indices are expected to depend on the value of subsidies and the role of the sectors in responding to the intermediate demands of production activities. Thus, dividing subsidies associated with a certain sector by its inflation index (PIR) releases the inflation rates from the subsidies value and determines the value of subsidies that is required for a one percent decrease in inflation rate. Thus, as displayed in Table 3, bank and insurance sectors need fewer subsidies to prevent a unit inflation rate whereas public services sector needs the most subsidies among these sectors to decrease a one percent in inflation rate.

To explore the reason for this phenomenon two right hand side columns of Table 3 display the inflation that is prevented from a hundred billion Rial subsidies and the intermediate demand to total output ratio of the related sectors, respectively. In fact, the column on inflation reduction rate for a hundred billion Rial subsidies is another way to release the role of the sectors

on PIR from the value of subsidies. As shown in this table, the inflation that is prevented from a hundred billion rial subsidies has a direct relationship with Intermediate Demand for Total Outputs ratios of concerned sectors, except in education and public services sectors, which can be due to other factors, e.g., the importance of the sector in the total inputs production. However, the correlation coefficient for the inflation reduction rate of a hundred billion Rial subsidies with the intermediate demand for total output ratio of the related sectors is estimated to be about 92% that is significantly greater than that of the variables such as the intermediate demand for products of these sectors to total intermediate demand in the region.

In other words, the sectors a substantial number of whose products are consumed as intermediate consumption by production sectors have stronger relationship with these sectors' prices. So a unit increase of their products' prices would have more impact on inflation rate compared with other ones. Otherwise, in some cases, like education and public services, the stronger indirect effects compensate its shortage in direct effects compared to health, as shown in Table 3 Finally, total subsidies elimination in all sectors causes the PPI of the region to grow to 103.86 which itself results in a 3.86% inflation in products prices. In addition, 12878 million 1994's rial subsidy is required to prevent from one-percent inflation in products prices of the region. In other words, a hundred billion rial subsidies on products of these sectors prevent 7.77% inflation from sectors products prices.

Table 3: The Role of Subsidies Elimination from the Production Sector (1994 Thousand Rial)

Sectors	PPI	PIR	Subsidies /PIR	IRMS[1]	ID/TO[2]
Bank & Insurance	100.03	0.03	10035	9.97	0.503
Water, Electricity & Gas	100.09	0.09	10535	9.49	0.359
Personal Services	101.39	1.39	12258	8.16	0.192
Food Processing Industries	102.43	2.43	12264	8.15	0.185
Health	100.053	0.053	16772	5.962	0.029
Education	100.037	0.037	17939	5.575	0.032
Public Services	100.003	0.003	22124	4.519	0.045
Total Sectors	103.86	3.86	12878	7.77	0.168

1- IRMS: Inflation Reduction rate for a Hundred Billion Rial Subsidies

2- ID/TO: Intermediate Demand/ Total Outputs

A similar estimation has also been carried out through subsidies elimination from different groups of households' expenditures. As a result of subsidies elimination from different sectors The CPI is estimated using relationship (2) (see table 4 We can estimate the Consumption Inflation Rate (CIR) on households consumption expenditures due to subsidies elimination from different sectors.

The CPI and CIR are dependent on the value of subsidies on the products of the sectors and the influences of the sectors on households' expenditures. To this end, we calculate the subsidies required to prevent one percent CIR in different sectors by divide subsidies to CIR. Based on this calculation, although the food processing industries subsidies elimination displays a higher inflation rate, unit subsidy elimination from water, electricity and gas sectors having the most influence on inflation rate on consumption expenditures of households. So prevention of a unit inflation rate of water, electricity and gas sector involves fewer subsidies compared with all other sectors. As shown above, the households' consumptions to total outputs ratio for all sectors have a direct relationship with the inflation reduction rate for a billion rial subsidies, except in the bank and insurance sector (See table 4). In addition, the correlation coefficient of these ratios with inflation reduction rate for a billion rial subsidies in different sectors is estimated to be more than 97% which is significantly greater than correlation coefficient with other indices such as the households' expenditures paid on these sectors products to total households consumption expenditures.

Table 4: Situation of Production Sectors in Consumption Inflation Creation in the Region (1994 Thousand Rial)

Sectors	CPI	CIR	Subsidies/ CIR	IRMS[1]	HC/TO[2]
Water, Electricity & Gas	100.22	0.22	4310	23.2	0.818
Food Processing Industries	106.26	6.26	4761	21.01	0.801
Personal Services	102.72	2.72	6264	15.96	0.572
Bank & Insurance	100.03	0.03	10035	9.97	0.172
Health	100.056	0.056	15874	6.3	0.248
Education	100.019	0.019	34933	2.86	0.106
Public Services	100.0003	0.0003	221243	0.45	0.011
Total Sectors	108.792	8.792	5654	17.69	0.500

1- IRMS: Inflation Reduction rate for a Hundred Billion Rial Subsidies.

2- HC/TO: Households Consumptions/ Total Outputs.

Like producer price index, total subsidies elimination in all sectors can be estimated. This estimation, it can help to the CPI of the region to grow to 108.792 that causes 8.792% inflation in consumption prices. In addition, 5654 million 1994's Rial subsidy is required to prevent one unit percent inflation in households consumption prices of the region. Thus, a hundred billion rial subsidy on products of these sectors prevents 17.69% inflation in prices for consumption expenditures of households.

GRP is one of indices that is studied in this paper. The GRP of the region is computed using relationship (10). To this end, it is assumed that the concerned subsidies are distributed among the households through two scenarios. In the first scenario, the subsidies are distributed among all households, irrespective of households income level whereas it is distributed among the five low-income owner groups of households with respect to the number of the households of these groups. The direct payment against subsidies leads to an increment in GRP of the region in the fixed prices.

It should also be mentioned that based on the calculations the results of which are shown in Table Five (with 95% confidence) a million rial subsidy elimination from all sectors, paid directly to the households, leads to a little more than the same size increment in GRP of the region. It is worth knowing that the GRP increment resulting from subsidies eliminations from Personal Services and Food Processing Industries sectors leads to a greater increment compared with the other sectors with the same confidence level. In addition, although in all cases the second scenario, except food processing industries, leads to a more increment in GRP of the region compared with the second one, with 95% confidence, there is no significant difference from this viewpoint.

Table 5: The Results of Subsidies Elimination on GRP of the Region (1994 Thousand Rial)

Sectors	Increment in GRP		Increment in GRP for one Million Rials Subsidies	
	First Scenario	Second Scenario	First Scenario	Second Scenario
Bank& Insurance	303158	304013	1007.002	1009.842
Water, Electricity & Gas	955312	957730	1007.511	1010.061
Personal Services	17357994	17397995	1018.723	1021.071
Food Processing Industries	30384641	30224067	1019.564	1014.176
Public Services	66829	67019	1006.87	1009.733

Health	895159	897637	1007.01	1009.797
Education	668341	670228	1006.943	1009.786
Total Sectors	51107372	50813451	1028.134	1022.221

Job creation in the region is another index that is considered in this paper. Table 6 is estimated using relationship (12). Based on this estimation, subsidies elimination from food processing industries and personal services sectors, to be paid directly to the households, lead to the most effective factor in job creation in the region, respectively. But a comparison of the effect of subsidies elimination on different production sectors in job creation in the region, with 95% confidence, reveals that a billion rial subsidies elimination from public services sector has a more significant effect on job creation, whereas the reduction of the same amount of subsidies has the least significant effect on job creation in the food processing industries sector compared with other sectors. In addition, with 95% confidence following each of these two scenarios makes no significant difference in job creation in the region.

Table 6: The Effects of Subsidies Elimination on Employment of the Region (1994 Thousand Rial /Person)

Sectors	**Increment in Employment**		**Increment in Employment for one Billion Rial Subsidies**	
	First Scenario	**Second Scenario**	**First Scenario**	**Second Scenario**
Bank& Insurance	71	72	236	239
Water, Electricity & Gas	224	225	236	237
Personal Services	4006	4038	235	237
Food Processing Industries	6841	6811	230	228
Public Services	16	16	241	241
Health	210	212	236	238
Education	157	158	237	238
Total Sectors	11373	11317	229	228

Table 7: The Effects of Subsidies Elimination on Gini Coefficients in the region (1994 Thousand rial)

Sectors	Gini Coefficient		Subsidies/ Gini Coefficients	
	First Scenario	Second Scenario	First Scenario	Second Scenario
Public Services	0.457219	0.457195	145167	145174
Bank & Insurance	0.4571	0.4570	658587	658743
Education	0.4570	0.4567	1452414	1453174
Health	0.4569	0.4565	1945717	1947081
Water, Electricity & Gas	0.4567	0.4564	2076159	2077710
Personal Services	0.4503	0.4443	37840835	38353343
Food Processing Industries	0.4416	0.4312	67490868	69106934
Total Sectors	0.4343	0.4175	114444491	119056840

The income distribution in the region is the last index that is studied in this paper. Although it seems that the second scenario has fairly more significant effect on the income distribution inlity in the region, with 95% confidence, there is no significant difference between the results of two scenarios. But elimination of subsidies from different production sectors, to be paid directly to the households, has different effects on the Gini Coefficient of the region, so that unit subsidies elimination from the public services sector is about 467 times more efficient than that in the food processor industries sector. In addition, the Gini Coefficient size for the region in the year 1994 is estimated to be about 0.457244. Thus, with 95% confidence there is no difference between Gini Coefficient of the region as a result of subsidies elimination from each of these sectors except subsidies elimination from Food Processing Industries sector that leads to a significant decrease in the Gini Coefficient of the region.

Conclusion

This paper presents an approach to analyse direct payment against indirect payment. Since the subsidies elimination leads to an increment in products prices, with some presumption, a procedure has been proposed for SAM table adjustment in cases where there is no indirect payment to consumers. The Laspeyres Price Index is developed to estimate the PPI and

CPI for the region using the SAM table. The related relationships are developed to examine the effects of direct payments, as opposed to those of the indirect payments, to households on GRP, job creation and Gini Coefficient.

The proposed approach is applied using the 1994 SAM for Golestan Province to compare the direct and indirect payments. Based on the results of the research, subsidies elimination leads to growth in PPI and CPI. Yet, the direct payment causes a significant increment in GRP and employment in the region. In addition, when applied, the model will reveal that direct or indirect payment will not change the Gini Coefficient index significantly in none of the sectors except the food processing industries.

As indicated in the discussion section, the inflation from subsidies elimination is not significant enough to consider. But recently, there is high inflation due to reduction of fuel subsidies. Although the inflation originates mainly from production expenditure, in fact, most of the inflation rate originates from prices expectations. It is also worth mentioning that in spite of the fact that it is commonly believed that subsidies lead to a more even income distribution, the present calculations reveal that subsidies elimination from the most sectors has no significant effect on the Gini Coefficient in the region. Finally, despite the fact that finding the real low-income groups of households is generally difficult in the implementation stage, with 95% confidence, the two different scenarios have no significant different impacts on these indices.

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