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The Impact of the Government's Supportive Policies for Comparative Advantages of Agricultural Products (A Case Study of Selective Crops in Sistan and Baluchestan Province of Iran)

N. Dahmardeh and M. Faghihzadeh

Department of Economics, University of Sistan and Baluchestan, Zahedan, Iran

Abstract: This research attempted to determine the rate of comparative advantage and priority of cultivation for some agricultural products, in Sistan and Baluchestan province such as wheat, barley, maize, tomatoes, onion and watermelon based on cross-section data in 2003-2004 using criteria of comparative advantage. The result of the research indicates that based on DRC indicated products such as wheat, barley and maize lack comparative advantage while, watermelon, tomato and onion have comparative advantage. NPC indicator for all mentioned products indicates that the government undertakes indirect subsides to produce and support the products. EPC indicator for all mentioned products in Sistan and Baluchestan province reveals that the government's interference in input market and products has been in favor of producer. NPI indicator for all products indicators payment of indirect subsides for trade. NSP indicator for barley and maize being negative demonstrates the production and export of which would bring no profit while this indicator for watermelon, tomato, wheat and onion has been positive presenting that production and export of which carry economical justification. The production of wheat regarding the lack of comparative advantage through the government's support to produce and to export can be profitable to the producer.

Key words: Comparative advantage · Policy analysis matrix · Sistan and Baluchestan

INTRODUCTION

To recognize the comparative advantages of different economic sections in regions and provinces of the country would be beneficial and necessity for the economic planning specially for the time being of which to trade globally and to be a member of the world trade organization considered being important. Therefore, this study is conducted based on the comparative advantages and the effect of supportive policies of the government for the agricultural section in Sistan and Baluchestan province [1].

Two hypotheses evaluated in this study that the first was Sistan and Baluchestan province has the comparative advantage to produce agricultural products and the second was the comparative advantage of the selective agricultural products in the province being decreased.

The Method of Data Collection: In this study the sectional data of the production cost related to the agricultural years 2003-2004 and 1998-1999. The agricultural organization of the province, FAO, commerce organization, Iran's customs and the institute of agricultural planning and economy have been used. The world prices of agricultural products have been provided by the commerce Ministry, the Ministry of Agriculture and Iran's customs.

The structure of the Policy Analysis Matrix (PAM) was initiated by Monke and Pearson [2] in the world and developed to analyze the agricultural policies. Some researchers are studying the expense of domestic sources and calculating the comparative advantage of citrus fruit production in Hormozgan province making use of input-output tables figured out expenses on market and the shadow price [3].

Introduction of the Model

The Elements of Matrix Are Defined as Follows:

A & E = Total income of one hectare of product at market and shadow prices respectively.

B & F = Total cost of tradable inputs of one hectare of product at market and shadow prices respectively.

Corresponding Author: Dr. Nazar Dahmardeh, Department of Economics, University of Sistan and Baluchestan, Zahedan, Iran

C & G = Total cost of non-tradable inputs of one hectare of product at market and shadow prices respectively.

D & H = Profit of one hectare of product at market and shadow prices respectively. Market prices are affected by government protective policies while shadow or real prices are determined in the competitive market and without government interference [1, 4-5].

I = This matrix indicates the difference between market and shadow incomes.

J = The matrix (J_{ij}= B_{ij}- F_{ij}) indicates the difference between the import exchangeable input cost of production in proportion to the market price and shadow price.

K = Matrix (K_{ik}= C_{ik}- G_{ik}) indicates the difference between the required domestic inputs cost to produce one unit of product at the market and shadow prices.

$$L_i = D_i - H_i = I_i - J_{ij} - K_{ij}$$
$$D_i = A_i - \sum C_{ij} - \sum B_{ij}$$

In this equation, D_i indicates market profit or the profit out of input used in the domestic market conditions which proves the government's interference. If D_i or market profit being positive the market profit will occur to the producer even with the government's interference, therefore, the producer can increase the profit as much as his production. However, if the shadow profit (H_i) is positive, the production will carry relative advantage meaning that the activity in the free-trade conditions involves profit. Otherwise, if (H_i<0), there is no efficiency to produce and any activity will make loss to the producer in the free-market state. If L_i>0 then instead of producing a unit of product, there will be more market profit than shadow profit which means the government's interference in the production has caused more profit to the producer compared to the free-trade state, therefore, the government's supportive policies are justifiable and profitable [6].

The Indicators of Comparative Advantage: By using the PAM matrix table, the following indicators are shown:

The Domestic Resources Cost (DRC): DRC can be computed by the following PAM matrix method:

DRC=G/ (E-F)

DRC determines the extent of domestic resources upon shadow costs to attain or save in a foreign change.

Nominal Protection Coefficient of Output (NPC): This coefficient measures the proportion of income in proportion to the market price to the one in proportion to the shadow price formulated as NPC=A/E. If NPC>1 then the product market price will be more than shadow price meaning the indirect subside has been applied on the product.

Effective Protection Coefficient (EPC): If EPC>1, means that the government will support the production. EPC= (A-B)/ (E-F) = (value added based on market price)/ (value added based on shadow price)

Nominal Protection Coefficient of Input (NPI): This coefficient would compute the proportion of tradable input cost on the proportion of the market price to the one on Shadow price. NPI=B/F

Net Social Profit (NSP): This indicator is resulted from shadow cost out of shadow income, besides, indicates the making profit rate of product's shadow price. NSP=(E-F-G)

Shadow Prices: In the policy analysis matrix, in addition to the input market prices and the incomes out of production to the shadow prices are required. Inputs are classified in to two groups: 1-tradable inputs 2-non-tradable inputs.Different methods to determine shadow prices are as the following:

A-The Shadow Price of Tradable Inputs: The tradable inputs are import inputs which are used in the process of product production being exchanged in the world markets. The inputs include machinery, pesticides and chemical fertilizer. To determine the shadow price is as the following:

The Machinery Shadow Price: The expenses used for the agricultural products mainly consist of different kinds of tractors, pesticides sprayer, water pump, Automotives threshers. compared to the other machinery, tractors are most used, in plowing, disking, toweling, sowing, thus, the shadow price of tractors as the machinery shadow price will be determined in this research.

The Shadow Price of Chemical Fertilizer: Chemical fertilizers are quite exchangeable items. Some quantities of chemical fertilizer are provided domestically, the others are imported. The way to evaluate the shadow price of chemical fertilizer indicated in the following formula.

The shadow price of chemical fertilizer = $\sum(x_i)(P_i) \Big/ \sum x_i$

Where;

X_i= The extent of fertilizer type i

P_i= Price of fertilizer type I and shadow price of used fertilizer is the price of CIF of imported fertilizers.

The Shadow Price of Plant Disease Control and Chemicals Pesticides: The most imported poisons used for the agricultural products are herbicides, fungicides, pesticides. The shadow price of poisons accounted as the following:

The shadow price of poisons= $\sum(x_i)(P_i) \Big/ \sum x_i$

x= The extent of poison type i, pi the poison price type I and the shadow price of poisons is the CIF price of imported poisons.

B- the Shadow Price of Domestic Elements of Production: The domestic or non-tradable inputs include animal fertilizer, seed, water, labor in which the way to determine the shadow price will be expressed later.

The Shadow Price of Land: The cost of agricultural land opportunities is the same as the cost of the land shadow opportunity. Therefore, to determine the shadow price of land, the average rent of land price for the company products is accounted.

The Shadow Price of Water: The market price or the price the farmers spend to use water over shadowed by different factors such as, the time of irrigation in the region and the kind of water source (well, river…). Since, the farmers don't pay using water, just the cost of seeking to acquires will be considered as the shadow price in this research.

The Shadow Price of Labor: Labor differs from the other inputs so that it is not easily transferred in contrast to the chemical fertilizer, for example.

The Shadow Price of Seed: Seed is the important input to increase the function of agricultural products. Seed is an input that the farmers produce and exchange it and there isn't usually special distribution in its market. Therefore, its market price will be the same shadow price.

The Shadow Price of Animal Fertilizer: Since, the animal fertilizer is a by product, no rant or subside is considered and its price is based on the comparative market of supply and demand thus, the shadow price of animal fertilizer seemed to be the same as the market price.

The Shadow Price of Exchange: In this study, theory of purchasing power parity (PPP) in two states namely absolute and comparative used to calculate the shadow price of exchange as the following:

$$E = P_{ig}/P_{dg} = 3467210/390/95 = 8869$$

P_{ig} and P_{dg} are the price of one ounce of gold in the domestic market (based on Rails) and world market (on dollars) respectively which based on the monthly reports (Monthly bulletin of statistics 2003) and the Central Bank. Upon the comparative method of PPP the exchange equality of Rail on dollar used as the following:

$$E = (P_I/P_I^*)\ E0 = (1028.695)/(137.15).1298 = 9738$$

P_I= Price of the domestic consumer,

P_I^*= Price of American consumer and E. =Free market exchange rate in 1990.The reason to choose 1990 as a basic year is that no great changes occurred in the exchange market at ever since.

RESULTS AND DISCUSSION

PAM matrix accounted for any of the products are summarized in the Tables 2-9.

Matrix D<0 indicates that the government's interference wouldn't lead to the profit making of production. Matrix H_i<0indicates that free trade of production damages the producer. Matrix I_i>0 indicates that the government pays indirect subside to the producers. Matrix J_{ij} and K_{ik} indicate that the domestic producers buy the imported inputs less than the world price respectively. Therefore, they receive subsides.

Matrix L_i indicates the producer will make more profit, if the government interferes in the production in contrast to the free trade state (or experience less loss).

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Table 1: The consideration of PAM model

	Income	Cost Exchangeable inputs	Domestic inputs (non-exchangeable)	Profit
Market price (private)	A_i	B_{ij}	C_{ik}	D_i
Shadow price (social)	E_i	F_{ij}	G_{ik}	H_i
Deviation	I_i	J_{ij}	K_{ik}	L_i

Table 2: PAM matrix of barley per hectare in Sistan and Baluchestan, 2003-2004, Unit: 10 Rails

	Income	Cost Exchangeable inputs	Domestic inputs (non-exchangeable)	Profit
Market price (private)	253592	54845	335215	-127458
Shadow price (social)	249813	119845	544518	-414550
deviation	13779	-55000	-208303	287082

Source: research findings

Table 3: PAM matrix of watermelon per hectare in Sistan and Baluchestan, 2003-2004, Unit: 10 Rails

	Income	Cost Exchangeable inputs	Domestic inputs (non-exchangeable)	Profit
Market price (private)	1732599	54102	301275	1377221
Shadow price (social)	1570053	138479	725177	805407
deviation	52535	-84377	-424901	571814

Source: research findings

Table 4: PAM matrix of tomato on per hectare in Sistan and Baluchestan, 2003-004, Unit: 10 Rails

	Income	Cost Exchangeable inputs	Domestic inputs (non-exchangeable)	Profit
Market price (private)	2179885	25445	377273	177157
Shadow price (social)	1917510	52971	938548	915991
deviation	252375	-37525	-551275	851175

Source: research findings

Table 5: PAM matrix of wheat per hectare in Sistan and Baluchestan, 2003-2004, Unit: 10 Rails

	Income	Cost Exchangeable inputs	Domestic inputs (non-exchangeable)	Profit
Market price (private)	373359	151079	440297	-228017
Shadow price (social)	275175	187821	542499	-454144
deviation	97183	-25742	-102202	22512

Source: research findings

Table 6: PAM matrix of maize per hectare in Sistan and Baluchestan, 2003-2004, Unit: 10 Rails

	Income	Cost Exchangeable inputs	Domestic inputs (non-exchangeable)	Profit
Market price (private)	5013318	37557	339585	125075
Shadow price (social)	475533	157897	289555	-311033
deviation	27785	-120240	-289381	437405

Source: research findings

Table 7: AM matrix of onion per hectare in Sistan and Baluchestan, 2003-2004, Unit: 10 Rails

	Income	Cost Exchangeable inputs	Domestic inputs (non-exchangeable)	Profit
Market price (private)	2492252	44917	433272	2014073
Shadow price (social)	2303723	171014	183145	1514395
deviation	188539	-125097	-185042	499578

Source: research findings

Table 8: PAM matrix indicators of products per hectare

product	Barley	Watermelon	Tomato	Wheat	Maize	Onion
DRC	4.182	0.472	0.560	6.139	1.980	0.289
NPC	1.055	1.037	1.13	1.351	1.05	1.081
EPC	1.660	1.095	1.16	2.402	1.46	1.07
NPI	0.457	0.390	0.419	0.857	0.238	0.262
NSP	-41455	571814	915991	2261207	-311330	499578

Source: research findings

Table 9: DRC indicators in 1998-1999

Product	DRC	Elasticity of DRC to foreign products prices
Barley	6.51	-0.89
Watermelon	0.72	-0.31
Tomato	0.43	-0.50
Wheat	8.73	-0.15
Maize	3.002	-0.76
Onion	0.95	-0.50

Source: research findings

producers. Matrix J_{ij} and K_{ik} indicate that the domestic producers buy the imported inputs less than the world price respectively. Therefore, they receive subsides.

Matrix L_i indicates the producer will make more profit, if the government interferes in the production in contrast to the free trade state (or experience less loss.

Matrix $D<0$ indicates that the government's interference wouldn't lead to the profit making of production. Matrix $H_i<0$indicates that free trade of production damages the producer. Matrix $I_i>0$ indicates that the government pays indirect subside

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Matrix L_i indicates the producer will make more profit, if the government interferes in the production in contrast to the free trade state (or experience less loss.

Matrix D>0 indicates that the government's interference leads to the profit making of production. Matrix H_i>0 indicates that production in free trade will be in favor of producer. Matrix I_i>0 indicates that the government pays indirect subside to the producers. Matrix J_{ij} and K_{ik} indicate that the domestic producers buy the imported inputs less than the world price respectively. Therefore, they receive subside.

Matrix L_i indicates the producer will make more profit, if the government interferes in the production in contrast to the free trade state (or experience less loss).

CONCLUSION AND SUGGESTIONS

- To take great measures for the products having the comparative advantage (watermelon, onion, tomato) through necessary policies and planning.
- To decrease the plantation of products lacking the comparative advantage (wheat, barley, maize) or the increase of function or the decrease of domestic and foreign input costs to improve DRC indicator.

The results indicate the lack of comparative advantage in wheat (DRC= 5.139), barley (DRC= 4.189), maize (DRC= 1.980) and the existence of comparative advantage in watermelon (DRC= 0/472), onion (DRC= 0.289) and tomato (DRC= 0.505).The above-mentioned figures prove that the shadow price proceeds the shadow income to produce wheat, barley and maize in the province while, the shadow price is less than the shadow income to produce watermelon, onion and tomatoes.Therefore, the hypothesis of comparative advantage to the wheat, barley and maize is rejected in contrast to watermelon, tomatoes and onion.

NPC indicator for the mentioned products indicates the provision of indirect subsides of government to support production. From the economical point of view, the provision of subsides to the products lacking comparative advantage means the waste of energy; therefore, these subsides should be considered carefully. EPC indicator for the mentioned products indicates the government's interference in the market of inputs which has been in favor of producer.

It means the farmer's income has increased through the government's interference in the market compared to the free trade besides; the value added on market price exceeds the value added on shadow price.

NPI indicator for the products indicates that indirect subsides paid for the tradable inputs. NSP indicator for barley (NSP=-41455), maize (NSP=-311330) being negative indicates that production and export of these products lack profit and is not justified economically.

High indicator of watermelon (NSP= 571814), tomato (NSP=915991), wheat (NSP=225127) and onion (NSP=499578) being positive indicates that production and export of which carry profit and justified economically. The point on the production of wheat is that in spite of absence of comparative advantage of which it would be profitable to be produced and exported due to the government's supports.

The second hypothesis of the research expressed the decrease of comparative advantage of the mentioned products. The PAM matrix demonstrates the decrease of the comparative advantage in barley, watermelon, wheat, maize and onion in 1998-1999 to 2003-2004 confirming the hypothesis; however, the comparative advantage of tomato increased rejecting it.

The negative sign of elasticity of DRC to foreign products prices indicates the direct relationship between them and the foreign prices of product and the comparative advantage; the occurrence of increase in one causes the some increase in the other and vice versa. The

elasticity of DRC to foreign products prices of maize (E=-0.75) and barley (E=-0.8) demonstrating the increase of %1 in the foreign prices will increase the comparative advantage by 0.75 and 0.8%, respectively and vice versa. Therefore, the fluctuation of foreign prices of products causes the one in the producer's income implying high risks for the producers [5-11].

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