



Reviewing the Comparative Advantages of Producing Tomato and Cucumber in Khorasan Razavi

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ABSTRACT: This research aims to study the comparative advantages of producing tomato and cucumber in Khorasan Razavi for crop year 2013-2014. Results revealed that the province enjoys comparative advantages of producing these crops. As the producer Nominal Protection Coefficient (NPC) for both crops is less than 1, the burden of tax is indirectly imposed on the producer. The Nominal Inputs Protection Coefficient (NIPC) is greater than 1 for both tomato and cucumber; this means that an indirect tax is imposed on producers in using inputs. The Effective Protection Coefficient (EPC) is less than 1, or government's interventions come to producers harm. Finally, the Net Social Profitability (NSP) is positive for both crops. Considering shadow prices, producing tomato and cucumber carry with itself the social profitability of more than 6,930,000 and 5,560,000 IRR respectively.

Keywords: Comparative Advantage, Nominal Protection Coefficient (NPC), Nominal Inputs Protection Coefficient (NIPC), Effective Protection Coefficients (EPC), and Net Social Profitability (NSP)

INTRODUCTION

Comparative advantage is an important economic index for production planning, export and import. It shows that if a country can produce a good at a lower relative opportunity cost or autarky price, i.e. at a lower relative marginal cost prior to trade, the commodity brings a comparative advantage over another ones. Any country or region, in fact, enjoys comparative advantages in producing a particular group of commodities based on its natural potentials and capabilities and the frequency of the productivity of production factors. It can, thus, be interested in gain from exporting such commodities. The comparative advantage of international trade is revealed when it comes to a free and fair global market in which these are only market forces that determine production and trade. This is a fact hardly comes true. In the international trade, the comparative advantage should be seen from two different perspectives. First, it should be said for certain that the exporting country gains the comparative advantages in producing a good at a lower cost and offering them with more reasonable prices to the market than other commodities produced in that country. Second, the commodity should be guaranteed to be supplied at lower prices comparing with international competitors, because there are competitors for which offering cheaper goods is also important. Agriculture is not of most important sectors of our country [Iran] but also brings food security and health for the society. On the other hand, it can inject foreign exchange into development ventures. Therefore, it is highly important for researchers and officials to take this into deep consideration in the face of international competitors in the world of free trade.

Given the great potential of Khorasan Razavi in producing vegetable products, especially tomato and cucumber, a wise export plan is extremely required. A research study on comparative advantage and protective indices can well define the conditions of planning for export in future. This research, thus, is primarily aimed at checking the comparative advantages of producing tomato and cucumber in Khorasan Razavi.

RESEARCH BACKGROUND

The absolute advantage was first introduced by Adam Smith in 1776 in the "Wealth of Nations". Forty years later, Ricardo established the law of comparative advantage to elaborate an important part of the global trade. Comparative advantage is an economic law that has been remained undoubted (Salvatore).

To comprehensively study policies, Munch and Pearson (1989) invented the Policy Analysis Matrix (PAM) and calculated the comparative advantage by the matrix components. The proposed method was welcomed by researchers and several research studies were then carried out accordingly. Some of them have been referred to as follows:

In their studies in India, Mohanty *et al.* employed PAM to find the productivity of cotton production in five major producing provinces. Results showed that the second major producing province suffered from inefficient productions.

To calculate the comparative advantage of Bangladesh in producing agricultural crops in the international trade, Shahabedin and Doravesh used social factor productivity index and domestic resource cost ratio. Relying on the social productivity analysis, they argued that the country gain comparative advantages in producing rice.

Husain *et al.* (2006) investigated the sugarcane competitiveness in Punjab and Sindh, Pakistan, by means of policy analysis matrix. According to results, both provinces are deprived of comparative advantage in producing sugarcane.

Aiming to study the comparative advantage conditions and producing summer soya (irrigation and dryland farming), as an important oil seed in Iran, Noori *et al.* (2008) concluded by policy analysis matrix and supportive indices that despite of comparative advantages, production of soya was not supported by government policies.

Karbasi *et al.* (2009) looked at the comparative advantages of major farming products in Kerman. They concluded that Kerman enjoyed comparative advantages in producing and exporting wheat, maize, chickpea, sugar beet, and potato.

In a research study using policy analysis matrix and domestic resource cost index, Jolayee and Kazemnejad (2011) calculated the relative advantages and the supportive policies in producing raisin in Qazvin, between 2006 and 2007. The domestic resource cost index was estimated at 0.78. This showed the comparative advantage of this crop. The supportive indices also revealed that the domestic policies had not supported this product.

In another research study using policy analysis matrix and domestic resource cost index, Jolayee *et al.* (2011) calculated the relative advantages in producing pomegranate in Fars, between 2007 and 2008. The domestic resource cost index was estimated at 0.42. This showed the strong comparative advantage of this crop. The NPC was also estimated at 0.49. This revealed that domestic policies had decreased farmers' earnings based on global prices and had been to the harm of producing this crop. In addition, producers have been imposed indirect tax. NPI shows the impact of government's policies on inputs. This has been calculated at 0.44 for producing pomegranate in Fars. Accordingly, based on domestic policies, the government has considered subsidy for inputs. EPC indicates the domestic policy outcome in two perspectives of earnings and input. EPC was estimated for producing pomegranate in Fars at 0.49 showing that the government did not support this crop in terms of input and earnings.

Khaledi and Toosi (2012) calculated by PAM the comparative advantages and supportive indices of producing oil sunflower seeds and rapeseed in Kermanshah, between 2007 and 2008. Results obtained in terms of DRC of producing oil seed revealed that the province had comparative advantage in sunflower seeds but not in rapeseed. According to NPC, the market oil seed price was higher than shadow prices. In fact the government's policies cause the prices to be higher than the border prices in shadow exchange rates. This is as the result of indirect subsidies paid to producers of oil seed in Kermanshah. According to NPI results on producing oil seeds, farmers are supported in tradable

inputs. Thus, increasing and persistent support of rapeseed farming and price support of sunflowers are recommended.

MATERIALS AND METHODS

A. Comparative advantages

Using the following formula, the comparative advantages have been studied

$$DRC = \frac{G}{E - F}$$

Where G is the cost of non-tradable inputs at the shadow prices, F is cost of tradable input at the shadow prices and E is the earnings at the shadow prices.

DRC is the ratio of the shadow value of the domestic net inputs to the shadow value of the traded net outputs. If $DRC > 1$, the related region is lack of comparative advantage and if $DRC < 1$, the region gains comparative advantage.

To study the government policy protections, the social cost-benefit and net social productivity, SCB (social cost-benefit), NPIC (nominal protection coefficients on input), NPC (nominal protection coefficient), EPC (effective protection coefficient) and NSP (net social profitability) have been calculated for these products in Khorasan Razavi.

B. Nominal Protection Coefficient (NPC)

It is estimated by PAM as follows:

$$NPC = \frac{A}{E} \quad (2)$$

A is Market price

E is Shadow price.

- (i) If $NPC > 1$, the market price is higher than the shadow price and no indirect subsidy is allotted to the producers.
- (ii) If $NPC < 1$, the market price is lower than the shadow price and an indirect subsidy is allotted to the producers.
- (iii) If $NPC = 1$, the product is not supported.

C. Nominal Protection Coefficient on Inputs (NIPC)

It is estimated by PAM as follows:

$$NIPC = \frac{B}{F} \quad (3)$$

B is the value of traded input to the market price

F is the value of traded input to the shadow price.

- (i) If NIPC is greater than 1; the value of traded inputs to the market price would be higher than their value to the shadow price. This means that no indirect tax is imposed on producers in using these inputs.
- (ii) If NIPC is less than 1; the value of traded inputs to the shadow price would be higher than their value to the market price. This means that an indirect subsidy is paid to producers in using these traded inputs.
- (iii) If $NIPC = 1$, there would be no protection policy in support of these inputs.

D. Effective Protection Coefficient (EPC)

It is defined as the difference in value added at domestic and world prices expressed as percentage of value added at world prices. Note that relatively low NPC rates applied to a product can result in quite high EPCs particularly where value added is small relative to output value:

$$Epc = \frac{A - B}{E - F} \quad (4)$$

A-B: value added to the market price

EF: value added to the shadow price

A. If $EPC > 1$, government policies support production.

B. If $EPC < 1$, government interventions are to the harm of production. Government imposes implicit tax on producers and the outcome of government intervention in product and input market is not to the benefit of producers.

Protection coefficients give the percent of protection rates:

$$(NPC - 1) \times 100 = NPR$$

$$(1 - NPC) \times 100 = NPIR$$

$$(EPC - 1) \times 100 = EPR$$

E. Net Social Profitability (NSP)

It calculates the production profit by applying shadow prices of the product and domestic and international production inputs. NSP is calculated by PAM as follows:

$$NSP = (E - F - G) \quad (5)$$

If NSP is greater than zero, there are comparative advantages; otherwise the production is lack of social profitability and comparative advantages.

F. Shadow Exchange Rate

The shadow exchange rate is especially sensitive in calculating the comparative advantage and finding

government protection. This rate is virtually a basis for an acceptable shadow price of traded products and inputs. It was estimated for 2007 by using Purchasing Power Parity (PPP, comparative) (Mohammadi, 2004):

$$PER = Er \times (WPI / CPI)$$

Where ER is the free exchange rate, WPI is wholesale price index outside the country, and CPI is domestic consumer price index, base year 2004. The market exchange rate was taken from Iran Central Bank statistics. The calculation value in 2007 was 11110 IRR per 1 Dollar.

Using PPP (absolute), the shadow exchange rate was also estimated (Mohammadi, 2004).

$$E = P_{ig} \div P_{dg}$$

Pig and Pdg are gold prices per ounce in domestic market (IRR) and in global market (Dollar) respectively. The required statistics and information were taken from Fao. The calculation rate was 9671 IRR per 1 Dollar.

RESULT AND DISCUSSION

Earnings of Tomato and Cucumber Production to the Shadow Prices

To calculate the shadow price per hectare, the dollar value of one kilogram products in the global markets is multiplied by the shadow exchange rate to obtain the price of one kilogram products in IRR. The product performance per kilogram is then multiplied by the IRR price to obtain the shadow price per hectare. The cost of loading and transferring to the consumption centers is also added.

A. Farm Shadow Price

The shadow price of the farm land in an open area is considered as equivalent with the rent. Considering the interest rate of 12%, the cost of investing opportunity is 7,200,000 IRR.

Table 1: Calculation of comparative advantage of cucumber and tomato.

product	(rial) NSP	EPC	NIPC	NPC	DRC
Cucumber	6933373	0.21	1.99	0.24	0.06
Tomato	5565068	0.38	1.99	0.41	0.08

Source: Calculations research

B. Product Shadow Prices

According to World Vegetable Center, the global prices of cucumber and tomato in 2014 are projected at 0.79 and 0.81 \$ per kilogram. The average prices projected by Iran for the same period are 0.3 and 0.13 \$. According to foreign trade statistics, Iran has exported around 32,000 and 17400 ton cucumbers (including pickled, fresh and chilled) and tomato (including fresh and chilled) in 2014. The average export prices have been 0.325 and 0.176 per one kilogram of cucumber and tomato respectively.

Table results show that DRC for cucumber and tomato is less than 1. This means that producing these crops brings comparative advantages.

On the other hand, NPC is also less than 1. This means that the market prices are less than shadow prices. So an indirect tax is imposed on producers.

NIPC is less than 1. Put it differently, the cost of traded input to the market prices is greater than the cost to the shadow prices. So an indirect tax is imposed on producers.

Effective protection coefficient (EPC) defines the difference in value added at domestic and world prices expressed as percentage of value added at world prices. Note that relatively low NPC rates applied to a product can result in quite high EPCs particularly where value added is small relative to output value.

This is the outcome of NIPC and NPC. It is less than 1 for both crops. In other words, the government interventions are to the harm of producers. Government imposes implicit tax on producers and the outcome of government intervention in product and input market is not to the benefit of producers.

NSP calculates the production profit by applying shadow prices of the product and domestic and international production inputs. Considering shadow prices, producing cucumber and potato brings more than 693,000 and 556,000 respectively.

CONCLUSION AND SUGGESTIONS

Results show that producing cucumber and tomato in Khorasan Razavi provides high comparative advantages. Production of these crops is recommended to be developed following marketing in foreign markets which guaranteeing the success.

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