Impact of the Protectionist Policies on the Potato Industry in Sri Lanka

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ABSTRACT. *This paper examines the welfare implications of protectionist policies on the potato industry in Sri Lanka. Discrete versions of nominal (consumer price/import price) and effective (domestic cost/import price) protection coefficients have been calculated for the period of 1971 to 1992. Based on these estimates consumer losses, producer gains, additional cost for the government and dead weight loss to the society were estimated. Although the environmental cost such as soil erosion and heavy fertilizer and chemical applications were not considered, it is clear that the impact of protectionist policies has made the country worse off.*

INTRODUCTION

The potato cultivation in Sri Lanka is confined mainly (85 percent of total extent) to Badulla and Nuwara Eliya districts. Around 6800 hectares are cultivated annually by approximately 25,000 farmers to produce nearly 100,000 mt of consumer potatoes (Ministry of Agriculture Implementation Programme, 1992-93). Potato production in the country is highly seasonal and location specific. Nearly 85 percent of the total production enter the market within five months of the year. This seasonality in production causes substantial fluctuations in retail prices (Suraweera and Agalawatte, 1983).

Per capita potato consumption in the country is estimated to be around 3.5 kg/year (Department of Census and Statistics, Food Balance Sheet 1992). This is low compared to the per capita consumptions of 38 kg/year for vegetables and 110 kg/year for rice. Further, the majority of the consumers have to restrict their potato consumption to the months of the year where the prices are low because the income and price elasticities of potato in Sri

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Lanka are 2 and 1.2 percent respectively (Suraweera and Agalawatte, 1983). This makes potato a luxury food item for average Sri Lankans, whereas, for most parts of the world, potato is either a normal or an inferior good.

The major policy measures taken by the government for development of the potato industry since late sixties include a total ban on consumption potato imports, restrictions of seed potato imports and distribution, subsidies on seed, fertilizer and agro-chemicals and government sponsored research, and extension activities.

Besides direct government intervention to the potato market, there are other costs such as environmental degradation, soil erosion, and water pollution problems associated with potato cultivation in the central region of the country. About 35 percent of the present potato lands in Nuwara Eliya are reported to be affected with Golden nematode problem (Department of Agriculture, Administration Report, 1991). This restricts potato cultivation in the affected lands and there is a tendency of shifting the cultivation to the forest reserves.

In view of the above situation, this paper attempts to investigate the consequences of direct government intervention to the potato market in Sri Lanka with the following specific objectives:

1. to estimate the social cost of the government intervention in the potato market; and

2. to analyze the impact of market interventions on the welfare of producers and consumers.

MATERIALS AND METHODS

Theory

Consider a pure trade model with no transport, shipping and transaction cost in trading with a number of commodities. In this model it is assumed that there are fixed quantities of n-1 goods namely, X^0_0, X^0_1, ... X^0_{n-1} available in the countries producing these commodities which trade them for different prices; p_0, p_1 ... p_{n-1} respectively. At equilibrium the sold-out

quantities must be equal to those bought-in. This can be expressed as follows:

$$\Sigma_{i=0} n^{-1} P_i X_i^d (P) = \Sigma_{i=1} {}^{n-1} P_i X_i^0 (D) \underline{\hspace{5cm}} (1)$$

Then let the aggregate demand be $\Sigma i(P) = X_i^D - X_i^0$: then the equation (1) becomes $\Sigma_{i=0} {}^{n-1} Pi \Sigma i = 0$ and this is the famous Walras' law.

Suppose if instead of n-1 of these goods, there are n markets and goods 1 to n, are in equilibrium. Then by definition $\Sigma_i (P_i e) = 0, i = 1, \ldots n$. If it is assumed that $P_0 \# 0$, $\Sigma_0(P_0) = 0$ and therefore $P_0 = P_0^e$. When n-1th markets are in the equilibrium the nth market must also be in equilibrium. Consequently this system can be expanded or reduced into n-1 equations.

If the demand curves are homogeneous in degree zero, and if one price (say P_0) is set equal to unity and good X_0 is made a numeraire commodity, the system could be written as equation (2).

$$\Sigma_i(P_i^e \ldots P_{n-1}^e) = 0; i = 1, \ldots n-1 \underline{\hspace{4cm}} (2)$$

With predetermined initial endowments, $\sigma E_i / \sigma P_j = \sigma X_i^D / \sigma P_j$ utility maximizing consumers Slutsky equation will be written as follows for trading model.

$$\sigma X_i^d / \sigma P_i = (\sigma X_i^D / \sigma P_i)u + (X_i^D - X_i^0) X \sigma X_i / \sigma M \underline{\hspace{3cm}} (3)$$

There if the income effects are symmetric or $\sigma X_i^D / \sigma P_i = \sigma X_i^D / \sigma P_i$, the matrix E will also be symmetric.

At equilibrium the quantities bought and sold are equal, and therefore, the supply of a commodity say potato, if increased, the price of potato will decrease. Such increase in supply of potato under this situation can be made to be realistic by liberalizing importation. In other words, by allowing free imports, potato supply can be increased so that the consumer prices will be in par with the world market prices. This in turn should increase consumer welfare and also force the producers to increase productivity, if they want to be in business. In the final analysis when one takes into account millions of affected consumers and the few thousands of potato producers in Sri Lanka, the net change in surplus to the society is most likely to be positive and society would be better off.

Data and method

Secondary data from the Departments of Agriculture (DOA), Census and Statistics and the Central Bank of Sri Lanka were used for this analysis. Cost of cultivation figures of consumption potato published by the Department of Agriculture (DOA) were corrected to include subsidies, taxes and the land cost. Farm gate prices received by potato producers obtained from Cost of Cultivation, DOA 1991 were used to calculate producer gains. Imported price of consumption potato used in the study was its Freight and Insurance Cost (FIC) at the official exchange rate (under valued). Consumer price of potato used in the analysis was the average retail price of potato in the local market obtained from the Census and Statistics report of Food balance sheet, 1992.

The Nominal Protection Coefficient (NPC) was calculated as the ratio of the retail price of potato (P^d) to its corrected import price (P^i); *i.e.* $NPC = P^d/P^i$. (Oyejide, 1981)

The Effective Protection Coefficient (EPC) was calculated as the ratio of real domestic cost of production to the corrected import price of consumption potato (Scandizzo, 1980). The EPC measures the effects of price distortions in the form of subsidies and taxes on both inputs and outputs. The real cost of production is calculated by taking into account the land cost, input subsidies on fertilizers, agro chemicals, and seeds.

EPC = Real cost of production/corrected import price

Although the corrected import prices were much lower than the retail price of potato during the period under review (FAO Trade Books, 1970-1992), the local consumers have paid a higher price due to the restricted supply. It was assumed that this price reduced the quantity demanded. Such consumer losses were calculated by using the price elasticity coefficient, price difference of retail and imported consumption potatoes and the population into consideration (Byerlee and Longmire, 1986):

Consumer welfare losses = (Pd-Pi) 1/Pe * N

where,
  Pd = Retail price
  Pe = Price elasticity coefficient
  Pi = Corrected import price

N = Population

Price differences of production costs and farm gate prices were used to calculate producer gains:

Producer gains = (Pf - Pc) * Domestic Production

where,

Pf = Farm gate price
Pc = Production cost

Government costs which are the indirect costs to produce potatoes locally were calculated using the price differences of real costs of production and corrected import price (Schiff, 1990). That is:

Losses to Govt. = (Pc-Pi) * Domestic Production

where,

Pc = Real production cost
Pi = Corrected import price

Total cost to the society is the welfare change of the producer and consumer and the indirect costs of the government to produce potatoes locally at a higher cost than importing same (Corden, 1971).

RESULTS AND DISCUSSION

The retail and corrected import price trends of consumption potatoes are shown in Figure 1. It is quite clear that the local potato prices have increased at a faster rate than the world prices; especially after 1980. The ratios of retail price to corrected import price are presented in Table 1, as Nominal Protection Coefficients (NPC). A ratio greater than unity implies that the government intervention in the consumption potato market in Sri Lanka, has increased the domestic prices of potato.

The Nominal Protection Coefficient although measures the effects of price intervention on output prices, ignores the aspects of government intervention on input prices. The Effective Protection Coefficient (EPC) incorporates the effect of price distortions into the measurement. Thus EPC is a better measurement to assess the amount of incentives given to the producers.
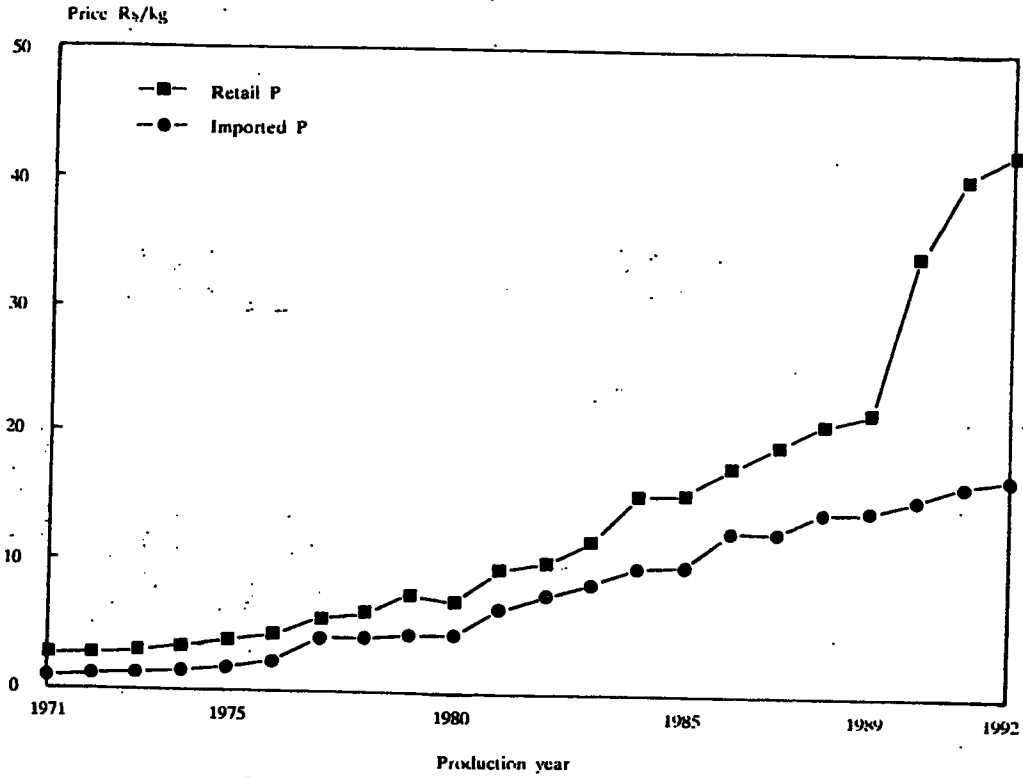
Price Rs/kg

Figure 1. Imported and retail prices of potato in Sri Lanka 1971-1992

Table 1.   Nominal (NPC) and Effective (EPC) Protection Coefficients for potato for the period of 1971-92.

Year	EPC	NPC
1971	1.50	2.67
1972	1.37	2.19
1973	1.67	2.21
1974	1.81	2.26
1975	1.68	2.10
1976	1.87	1.81
1977	1.20	1.35
1978	1.41	1.42
1979	1.64	1.64
1980	1.47	1.55
1981	1.40	1.45
1982	1.35	1.34
1983	1.32	1.38
1984	1.27	1.58
1985	1.27	1.57
1986	1.23	1.37
1987	1.24	1.53
1988	1.19	1.48
1989	1.25	1.54
1990	1.18	1.92
1991	1.23	2.40
1992	1.23	2.46

Table 1 indicates that the intervention policies have protected the domestic producer from external competition. As a result, as shown in Figure 2, local potato production increased till 1985, and suffered a set-back afterwards. The extent cultivated follows a similar pattern indicating that production increase has been directly proportional to the extent. The average yields have been almost static around 10 mt/ha, which is only half of the world average. This raises a serious question about the effectiveness of the government intervention in the potato industry with a view to protect Sri Lankan potato growers.
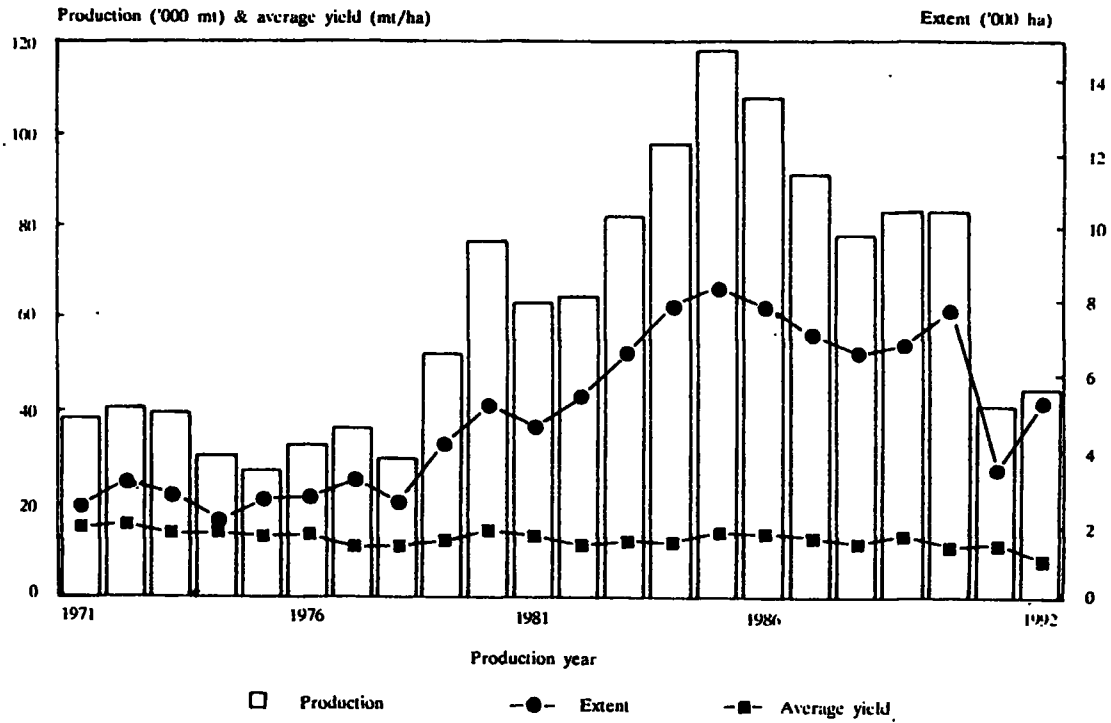
Figure 2. Production, extent & yield of potato in Sri Lanka 1971-1992

At present with the high farm gate prices enjoyed by the producers, the break even yield is around 6 to 7 mt/ha, and it is profitable to cultivate potato even in marginal lands at the expense of other competing vegetable crops. This implies that, production of other vegetables suffered, due to the government protectionist policies to potato industry.

Gunawardena and Chandrasiri (1980) have estimated that by the year 2000, extra 4500 hectares will have to be put under vegetables to meet the demand of the country (population increase estimated at 1.3 percent and the per capita consumption levels at 80 kg/year). This means that, at least the marginal potato lands should be made available for vegetables. Information on estimated welfare changes is presented in Table 2. The gain to 25,000 potato producers was 27.6 million rupees in 1971, whereas, consumers lost about 18.2 million rupees in the same year due to protectionist policies of the government. Further, the cost to the government in the form of subsidies, taxes and additional cost to produce potatoes locally in 1971 was around 65.9 million rupees. After 21 years, that is, by 1992 these figures have increased to 95, 28 and 638 million rupees respectively. The implication of these findings is that the loss to the country as a result of government intervention in the potato market has been extremely high and it is increasing every year.

Environmental damage caused by potato cultivation in the upcountry districts have not been quantified in this study. Samarakoon and Abeygunawardena (1993) have estimated the soil loss from Nuwara Eliya potato lands. In addition, Nuwara Eliya potato farmers add a fair amount of agro-chemicals and fertilizers to the water ways that originate from this region. The estimated costs would have increased if these costs were included into the calculations. The figures presented, therefore, have to be interpreted as lower bounds rather than the full cost of the environmental degradation. Similarly, government expenditure on research and extension activities has not been included into the analysis.

CONCLUSION AND POLICY IMPLICATIONS

Although potato is not a major component of Sri Lankan diets, efforts have been made by the government to increase potato production in the country.

Table 2.   Consumption losses, producer gains and losses to the government due to protectionist policies in Potato industry for the period of 1971-92.

Year	Govt. Cost	Producer Surpluses	Consumer Losses	Social Cost
	(Million Rupees)			
1971	65.90	27.58	18.15	56.47
1972	61.56	24.71	18.59	55.44
1973	66.13	17.82	20.55	68.86
1974	59.22	19.74	21.68	61.16
1975	57.89	19.66	23.94	62.17
1976	65.17	27.84	19.26	56.59
1977	55.07	22.25	19.90	52.72
1978	54.08	20.92	20.25	53.41
1979	155.81	29.38	22.47	148.90
1980	194.33	46.09	23.89	172.13
1981	188.93	36.14	26.37	179.16
1982	164.90	34.27	20.80	151.43
1983	268.83	53.60	22.01	237.24
1984	558.00	65.94	22.27	514.33
1985	670.39	89.86	24.58	605.11
1986	508.07	64.86	26.62	469.83
1987	616.53	73.29	28.79	572.03
1988	541.72	89.90	22.03	473.85
1989	652.03	99.60	23.99	576.42
1990	691.73	91.99	24.26	624.00
1991	673.07	93.90	26.77	605.94
1992	637.51	94.74	28.32	570.09

Due to government interventions in the market, potato producers enjoy higher farm gate prices when compared to the border price. Local yields have stagnated around half that of the world average. This is mainly due to low break-even yield levels of distorted market prices, where even at marginal productivity levels, potato is more profitable than the competing vegetables. However, local potato producers have not been able to meet the

demand of consumption potatoes in the country. This has led to erode consumer welfare at a much faster rate than the increased welfare gains to the producers.

Liberalization of the potato market may adversely affect 25,000 potato growers, but it will certainly improve the productivity of scarce resources.

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