

# **AN ECONOMIC ANALYSIS OF GOVERNMENT INTERVENTION MEASURES IN THE COCONUT INDUSTRY OF SRI LANKA**

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The apparent objectives of the government intervention measures in the coconut industry are identified and ranked. The inadequacy of data prevents estimation of basic coefficients required for the analysis. The partial equilibrium-analysis based on "a priori" expectations shows that the opportunities available to improve the terms of trade in desiccated coconut and edible copra exports justify government intervention in these two products in the form of export duties. There may also be some justification for expanding extension services and public investment on coconut research, which enables to realise the production objective of government. The implications of the study crucially depend on the assumptions and the partial equilibrium technique used.

## **1. INTRODUCTION**

The importance of the coconut industry in the Sri Lankan economy is highlighted by the increasing government intervention. This study attempts to analyse the economic results of policies which affects the coconut industry and to evaluate alternative policies which achieve more efficiently the apparent objectives. In Section 3 the efficiency, distributional and welfare effects of government intervention are analysed within a partial equilibrium framework on the basis of 'a priori' expectations, in the absence of empirical estimates. This is followed in Section 4 with an analysis of alternative policy instruments which could achieve more efficiently the apparent objectives of the government. The study concludes with Section 5 presenting a summary of findings.

## **2. THE OBJECTIVES OF GOVERNMENT INTERVENTION**

The government intervention in the coconut industry can be broadly grouped into as (i) domestic policies aimed at increasing production and productivity and (ii) trade policies aimed at raising export earnings and government revenue.

## **3. ECONOMIC EFFECTS OF INTERVENTION**

The analysis of government intervention in the coconut industry and of possible alternatives would, of course, be facilitated by estimates of relevant short-run and long-run demand and supply elasticities. The time series data available for the industry falls far short of these requirements<sup>2</sup>. However, the economic theory and previous studies enable one to formulate expectations as to the likely order of magnitude of the price elasticities of interest.

- a) The price responsiveness of aggregate output in the coconut growing industry is likely to be highly inelastic in the short run, but less so in the long-run. The responsiveness of marketed surplus is also therefore likely to be highly inelastic. (Yotopoulos & Nugett, 1976, P140).
- b) The supply elasticities of food nuts, copra, oil and d.c. are likely to be less than perfectly elastic. (Capital fixity in the short run).
- c) The domestic demand elasticities for food nuts, copra and oil are likely to be inelastic. (Staple food items).
- d) The foreign demand for fresh nuts, industrial copra and oil to be perfectly elastic. (Price taker).
- e) The foreign demand elasticities for desiccated coconut and edible copra are likely to be less than unity and may even be inelastic. (Price leader).

### **3.1. Domestic Policies**

Input and production subsidies and the price stabilization scheme for coconut oil comes under the category of domestic policies.

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<sup>2</sup> For detail see Chapter 3 of De Silva, 1979

- a) Input and Production Subsidies. Input and production subsidies in the coconut industry take the form of price subsidies. Figure 1 shows the effects of a price subsidy in the coconut growing industry where the supply (SS) is less than perfectly elastic and the demand (DD) is perfectly elastic.

A Price subsidy at the rate of EFOE has the following effects :

i) Production effect : Induced by increased producer price, OE', production expands AA' from OA. to OA' and producer's surplus by EE'IG. ii) Consumption effect : Although producer price is OE', consumers continue to pay the pre-subsidy price OE, without changing the volume of consumption, OB. iii) Balance of payment effect : Due to the unchanged consumption, the entire increased production becomes an exportable surplus, with a potential export revenue increase of AGHA', thus improving the balance of payment of the country. iv) Government revenue effect : A subsidy at the rate of EE'/OE requires a government revenue outlay equal to area EE'IH. v) Redistribution effect : A subsidy expands production, increases producer's welfare and exportable surplus but at the expense of government revenue. vi) Welfare effects : However, the subsidy increases the cost of production and leads to a net welfare loss equal to the difference between what the government pays out (EE'IH) and what producers receive (EF'IG) namely, area IGH.

The lower the elasticity of supply, the less the production effect and greater the per unit subsidy required to boost production and export a given amount. This becomes evident if AM is treated as the industry supply curve (completely inelastic).

The input price subsidy on fertilizer is different from the others in that it involves a foreign exchange cost . The foreign exchange cost of the fertilizer subsidy would be higher, the greater the elasticity of demand for fertilizer. This derived demand in turn would be greater, the more elastic and demand for the final product (Stigler 1954).

- b) Price Stabilization Scheme :

Under the price stabilization scheme, when oil prices are below the specified floor price, fixed by the Coconut Development Authority, it intervenes in the markets and buy oil at the fixed price. Hence this scheme is equivalent to a price subsidy during low price period, and so has effects similar to those described above.

### 3.2 Trade Policies :

- a) Effects of an export duty levied by a 'price taker'.

In fresh nuts, industrial copra and oil, where the foreign demand is assumed to be perfectly elastic, Sri Lanka is a 'price taker' and can not pass the duty burden on to consumers in the importing countries. In effect producers bear the burden of the duty as illustrated in Figure 2.

An export duty at the rate of E'E/OE reduce the price received by the producers by the amount EE' generating the following effects. i) Production effect : Production contracts by AA' from OA to OA' and the producer's surplus by E'EK<sup>3</sup>. ii) Consumption effect : Induced by the reduction in domestic price, domestic consumption increased by B'B and consumer surplus by E'EDH. iii) Balance of payment effect : The pre-duty volume of exports BA reduces to B'A', resulting in a reduction equal to A'JKA + BDGB' in export earnings which is unfavourable to the country's balance of payments. iv) Government revenue effect : An export duty at the rate of EE'/OE' on the volume exported BA brings a revenue equal to HGJI, to the government. v) Redistribution effect: The domestic consumers acquire welfare gains from an export duty at the expense of owners of and factors of production specific to the duty levied industry.

vi) Welfare effects : The country as a whole incurs a net welfare loss equal to the difference between the welfare loss to the producers (EE'K<sup>3</sup>) and the gains to the consumer (E'EDH) and to the government (HGJI), namely the area HDG and IJK.

- b) Effects of an export duty levied by a 'price leader'.

In the case of desiccated coconut (DC) exports Sri Lanka contributes about 30 percent of the world exports, sharing the international market with the Philippines in the proportion 3.7, thus is a 'Price leader' to some extent in the world dc market, as it with respect to the world market for edible copra, to which Sri Lanka contributes about 95 percent.

<sup>3</sup> Sri Lanka is a net importer of fertilizer.

The incidence of an export duty levied on a product with a less than perfectly elastic foreign demand is spread between domestic producers and foreign consumers. The burden of the duty on the latter would be more the lower the elasticity of demand relative to that of supply.

In figure 3 the effects of an export duty at the rate of  $E'E''/OE'$  are illustrated for a commodity where the entire production is exported. In this figure both demand (DD) and supply (SS) elasticities are assumed to be less than unity.

1) Production effect : Production contracts by  $AA'$  from  $OA$  to  $OA'$ , reducing producer's surplus by  $E'EPR$ . ii) Consumption effect : Since the entire production is exported, foreign consumption contracts by an equal amount to that of production, resulting in a loss in foreign consumers surplus equal to  $EE''QP$ . iii) Balance of payment effect : An export duty at the rate of  $E'E''/OE'$  reduces the export volume by  $AA'$ , but increases the foreign price to  $OE''$ , so that post duty export earnings amounts to  $OE''QA'$  which is greater than (or equal to or less than) the pre-duty earnings  $OEPA$  if the (negative of the) foreign demand elasticity is less than (or equal to, or greater than) unity. iv) Government revenue effect : The government revenue from the export duty amounts to  $E'E''QR$  which consist of foreign consumer's contribution ( $EE''QN$ ) and domestic producers contribution ( $E'E'NR$ ). v) Redistribution effect : Producers and foreign consumers. vi) Welfare effects : The losses by both foreign consumers ( $EE''QP$ ) and domestic producers ( $E'E'PR$ ) are greater than the revenue gains to the government ( $E'E''QR$ ), so the export duty reduces world welfare by an area equal to  $RQP$ . The exporting country gains only if  $EE''QN$ , is greater than  $NPR$ , which is less likely, the more elastic the foreign demand curve.

#### c) Supply restrictions by a 'price leader'

Due to the nature of elasticity of demand for Sri Lanka d.c. exports and its share in the international market, the supply restrictions have not only domestic but also international effects. In this section these international effects are analysed in relation to Philippines dc trade. Figure 4 shows the export restrictions on the Philippines' dc trade. The figure assumes that demand & supply in both countries are less than unity.

The dc exported by Sri Lanka and the Philippines is shown by  $S_{sl}$  and  $S_{ph}$  respectively and the horizontal aggregation of individual country export curves gives the world d.c. supply curve  $S_w$ . The world demand curve is  $DD$ . Under unrestricted trade Sri Lanka exports  $OQ_{sl}$  and the Philipphles  $OQ_{ph}$  which horizontally adds up to  $OQ_w$  the world dc supply and the equilibrium price is  $OP$ . If Sri Lanka reduces her exports to  $OQ'_{sl}$ , through supply restrictions, then her supply curve in effect take the form of  $Q_{sl}AB$ . (An ad valorem duty at the rate of  $PP''/OP'$  would shift the supply curve to  $S'_{sl}$ . This would result in the world supply curve taking the form of  $S_wCO$ , reducing the equilibrium quantity to  $OQ'_w$  and raising the price to  $OP''$ . The reduction in dc exports change the Sri Lankan export earnings from  $OPDQ_{sl}$  to  $OP''CQ_{sl}$ . The latter can be equal to, greater than or less than the former and the gains or losses from export restrictions depend on the nature of this difference. In contrast the Philippines increases her export earnings from  $OPFQ_{ph}$  to  $OP''GQ'_{ph}$  acquires net welfare benefits on account of Sri Lankan dc trade policy. However, the reduction in world dc trade results in a net welfare loss equal to area  $QRS$ .

## 4. TOWARDS MORE RATIONAL INTERVENTION MEASURES

It is evident from the analysis in Section 3, that any market intervention by government, reduces potential economic welfare. This section presents an analytical discussion of more rational intervention policies which can achieve more efficiently the apparent objectives of the government.

### 4.1. The Production and Productivity Objective

Intervention in the coconut growing industry to boost production and productivity would not be welfare-improving unless private and social costs of coconut production are different at the margin. The sub-optimal use of modern inputs and cultural practices and inadequate and biased research investment in the coconut growing industry appear to have led to divergences between social and private costs.

Figure 1 shows the effects of intervention in the presence of domestic divergences. In this figure the value of coconut produced is shown in the horizontal axis and its price in the vertical axis. The aggregate domestic demand curve for coconut is  $DD$ , the supply is  $SS$  and the foreign demand is  $EE$ . The production is  $OA$  of which  $OB$  is domestically consumed while  $BA$  is exported. Under the assumption of external economies, the marginal social cost ( $S'S'$ ) of coconut production is less than the private cost of production ( $SS$ ). In this illustration it is also assumed that the domestic demand curve ( $DD$ ) indicates not only the private, but also the social value at the margin of various quantities consumed. The price  $OE$  is determined in the international market and given. It is assumed that the exchange rate is in equilibrium,

thus the price to indicate the private as well as social value of exports. The socially desirable level of production is  $OA'$ , but due to the divergence between private and social cost, only  $OA$  is produced, hence the socially desirable production level could be achieved only by intervention. But the intervention should not alter the existing socially desirable level of consumption  $OB$ .

a) Subsidies to optimize Use of Modern Inputs

The return to fertilizer as an input in the coconut industry is well recognized (De Silva 1976). As a result, in 1956, the government introduced a fertilizer price subsidy to encourage its use. As reported by De Silva and Perera (1976), during the period 1964-1975, even with a 50 percent subsidy, the amount of fertilizer applied would have covered only 17 percent of total area if the recommended dosages had been used. There may be some economic justification for a subsidy to attract non-users, but the optimal subsidy is unlikely to be as high as the present 50 percent level. In any case, if the failure is in the understanding of (especially small) farmers as to the optimal dosage, a better instrument (from both an efficiency and a distributional view-point) is to expand extension services, especially to small farmers, to provide them with information on optimal fertilizer dosages.

b) Increased Public Sector Research Investment

Technical change, achieved through research in agriculture is the single most important variable in boosting the productivity in agriculture. As reported by Arndt and Rattan (1977), returns to investment in agricultural research have been two to three times higher than that of many other social investments.

In the Sri Lankan coconut industry, land is scarce while labour is the abundant and relatively inexpensive resource. If one accepts the Hayami and Rattan (1971) thesis, the new technology in the coconut industry should attempt to substitute labour for the scarce resource land.

The well publicised research results by the Coconut Research Board (CRB) refers to hybrids developed for the wetzone areas of the Island. Although the high yields from the new varieties are consistent with the land-saving objective, the purchased inputs and the level management required for hybrids are biased more towards the organized plantations than small and subsistence farms. Barlow and Peries (1977) have highlighted similar biases in the generation of technology by the public sector Rubber Research Institutes.

The effective demand for new technology in coconut arise only from a part of its users namely the educated, more politically-articulate and organized farmers with large scale plantations. The majority of potential beneficiaries of technology in the coconut growing industry, however, are small subsistence farmers who tend to be less educated, less politically-articulate and less organized as a pressure group. They are in a poorer position to create an effective demand for appropriate technology. This may well give rise to the plantation sector bias in the technology generated by CRB. By incorporating the technological requirements of the un-represented groups in policy makers' guide lines to CRB, it is possible to correct any distorted demand for technology in the coconut growing industry. Thus, if an expansion in coconut research is desirable, then it may be that the highest pay off from such additional public investment would result if that research is directed more towards the needs of small farmers.

c) A Price Subsidy Scheme.

A Price Subsidy is the most efficient short-run measure (in a distributional view point) to boost coconut production and productivity, after achieving the optimal levels in public research investment and expanded small-farmer oriented extension service. It also enables to partly offset the undesirable effects of export duties levied on coconut products.

## 4.2. Government Revenue and Domestic Consumer Welfare Export Duties :

If the other forms of taxes can be collected at less cost than via trade taxes, levying of export taxes would be a suboptimal instrument for achieving this objective. But given that there are collection costs and they are specially low for export taxes compared with other taxes, a set of export taxes may well form part of a first-best tax package, even if it leads to production and consumption distortions. An export tax structure, with higher rates when the elasticity of demand for exports is low and lower rates when the elasticity is high, enables a given amount of revenue to be raised at minimum distortion cost. "If the elasticity of demand for export is less than unity, it will pay to restrict the quantity of exports, since export income will be raised while fewer resources are used for export production" (Corden 1974, p.158). This forms the basis for the terms of trade argument for export duties. Such duties in addition help to satisfy the objectives of raising government revenue and keeping down domestic consumer prices.

Although, it is possible for a 'price leader to use its monopoly power to improve the terms of trade, the power is not unlimited. The optimal export duty concept enables a country to optimize the extent to which it can use the export duties to turn the terms of trade in its favour. This is illustrated graphically in Figure 5 where, DD is the export demand curve for the product which also represents the average export revenue curve, SS represents the domestic supply curve for export or the marginal cost of export supply and MM, the marginal revenue curve. The free market equilibrium is at Z where the export volume is OA and price is OP. At Z marginal cost is equal to the average revenue and not to the marginal revenue, thus the free market equilibrium is sub-optimal. Hence it is the country's interest to behave like a monopolist and restrict the export supply until marginal revenue is equal to marginal cost. This point is W where export volume is OA' and price OP2. This can also be attained through an export duty at the rate of  $P_1 P_2 / OP_1$ .

#### **4.3. Pot Holing Assistance as a Measure of Reducing Price Risk.**

The price stabilization scheme for coconut oil is a measure designed to reduce the risk of price slumps faced by coconut producers in general and specially the oil producers. In the event of a price slump 'pot holing' assistance may be better than a price stabilization scheme in achieving the price risk reduction objective. Pot holing is resorted to, to support prices rarely or infrequently, when abrupt and sharp price declines have adverse effects on production decisions and cause hardship to individual farmers. It is envisaged that if these low prices were to continue for some time, the industry would adjust to the new price regime (Industrial Assistance Commission, Draft Report on Wheat Stabilization, 1977, p.50). The superiority of a 'pot holing' scheme over a price stabilization or even a floor price scheme is, it neither interferes with the market mechanism nor become a constant burden to the treasury, unlike the latter scheme.

### **5. SUMMARY**

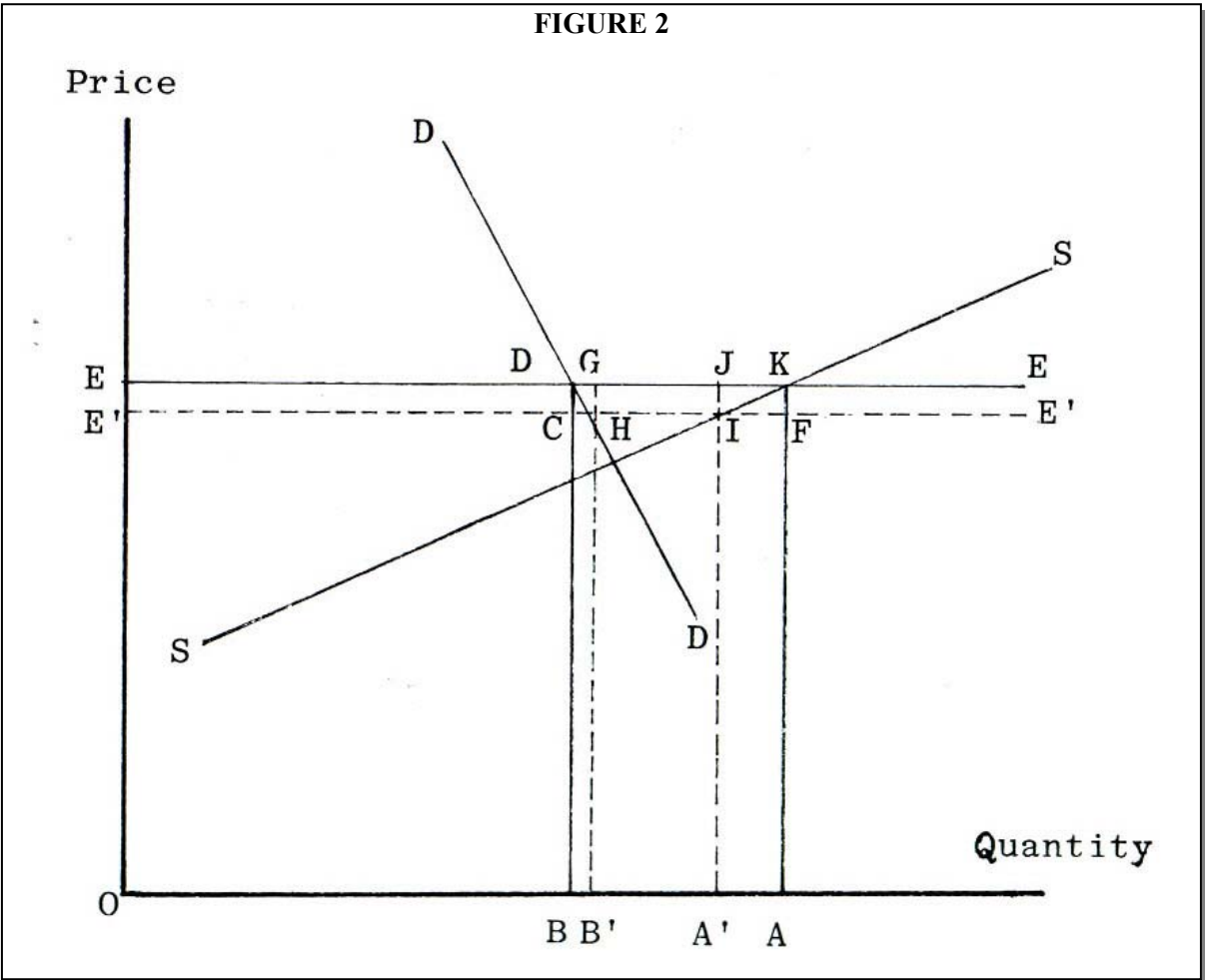
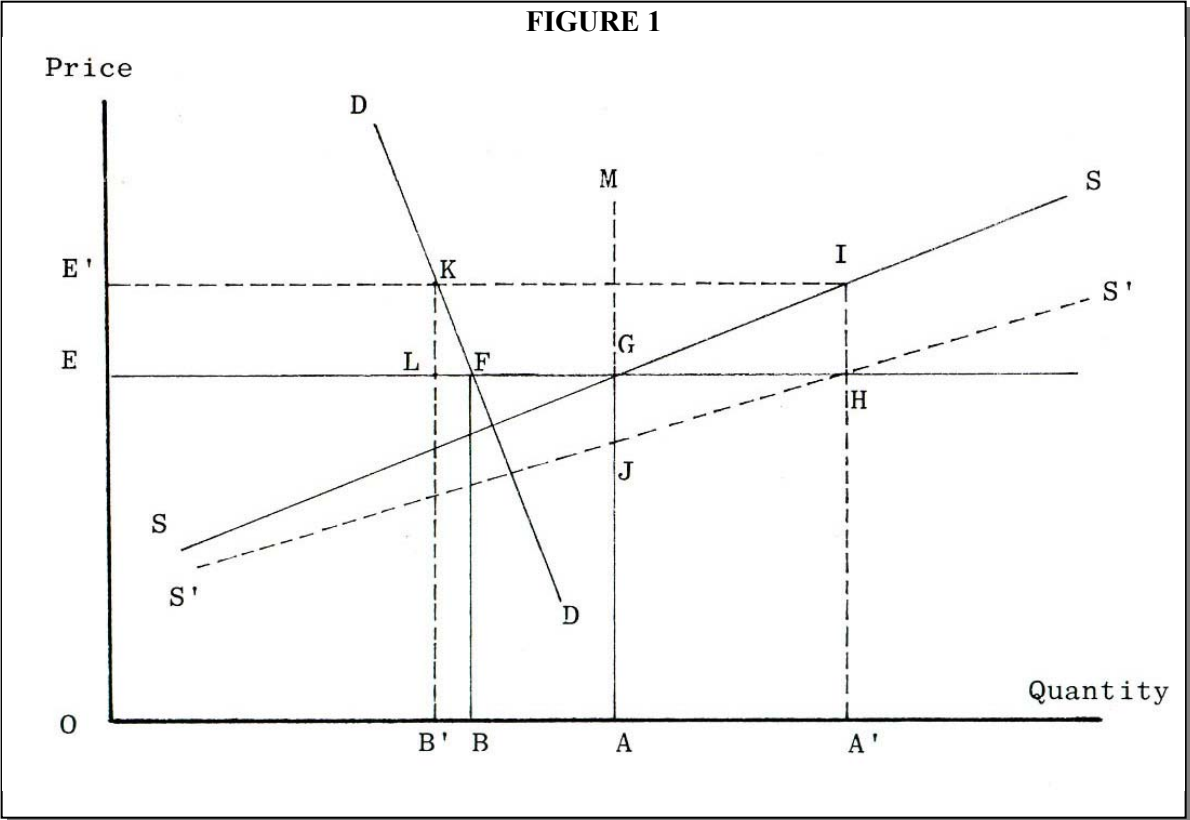
The government attempts to boost coconut production and productivity, collect revenue and reduce the price risk of oil production through intervention in the market for coconut products. However the disadvantages resulting from intervention being greater than that of advantages, the industry as a whole is likely to be smaller than could the case without government intervention.

The opportunities available to improve the terms of trade in d.c. and edible copra exports justify government intervention in these export markets. However, export duties are superior to quantitative restrictions due to the ability of the former to raise government revenue in addition to providing domestic consumer assistance. There may also be some justification for expanding extension services and public investment on coconut research. These policy measures enable the government to better realise its objective of boosting coconut production. In the event when export prices fall to very low levels 'pot holing' assistance has advantages over a price stabilization scheme as a risk reduction measure.

The assumptions made and the partial equilibrium technique used, limits the strength of the study. Further, the change in assumptions would result major changes in findings, thus one has to be careful in interpretation of the results.

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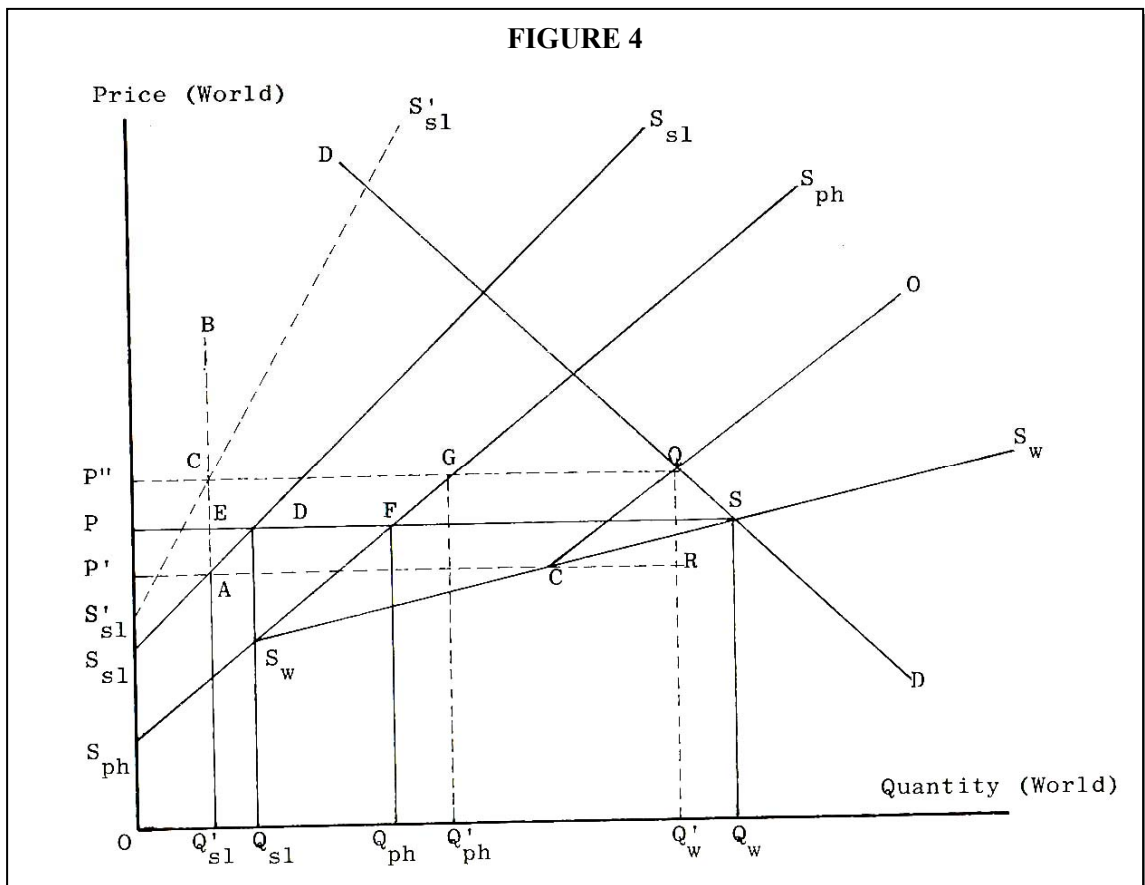
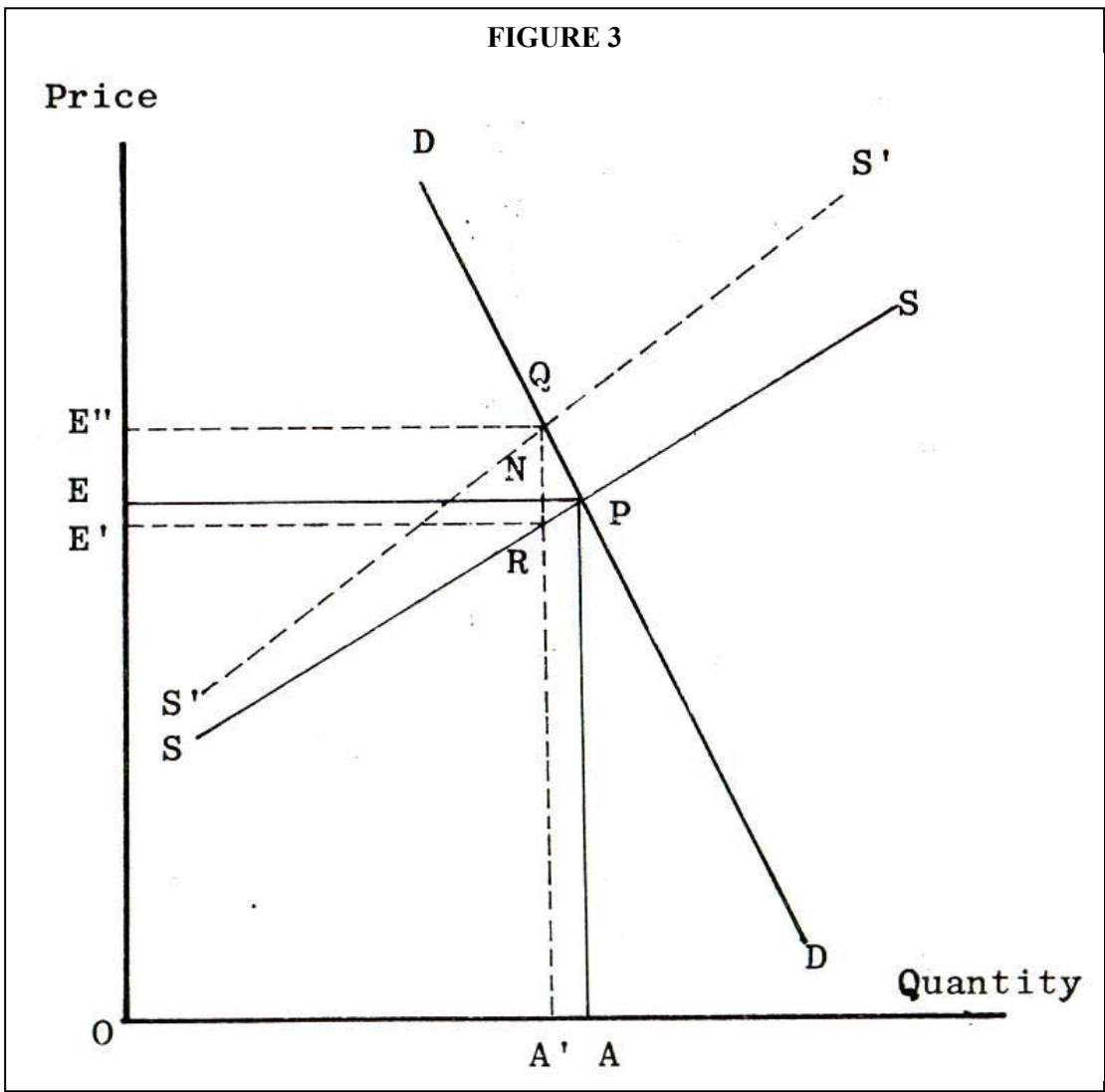




FIGURE 5

