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Economics Of Smuggling: Theory And Application

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ECONOMICS OF SMUGGLING:
THEORY AND APPLICATION

by

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of the requirements for the degree of

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ABSTRACT

In some less developed countries illegal trade, usually referred to as smuggling, is a very significant economic phenomenon. This thesis tries to answer various questions regarding the theoretical (and economic) implications of the presence of smuggling and then an extension of the theoretical framework is undertaken to study the problem of underinvoicing of imports in Pakistan, which is only one of a number of techniques which may be used to carry on smuggling.

Various distortions introduced by government policies such as the imposition of controls on trade or capital flows and indirect taxes or subsidies create incentives for smuggling. Assuming the existence of only one such distortion, namely an import tariff, we try to determine the equilibrium quantities and prices of a good through legal imports, smuggled imports and domestic production. This is done first in a partial equilibrium framework and then extended to the general equilibrium case. Other issues considered in the context of general equilibrium, using the standard general equilibrium international trade model, are: the effect of smuggling on domestic consumption, production and welfare; and the effect of changes in tariff on smuggling and welfare.

Black market for foreign exchange is an important source of financing illegal trade flows, and it exists because of exchange controls. Introducing exchange controls in our model, we compare the black market exchange rate with equilibrium exchange rate in the absence of exchange controls to find out if the former can be a guide to the latter. Questions such as the effect of exchange controls on total current account use of foreign exchange, the effect of an import tariff on the black market exchange rate and supplies of foreign exchange to the official authority are also considered in this kind of a framework.

Finally, using mainly the technique of partner country trade data comparison and employing regression analysis, we test the hypothesis whether there existed any underinvoicing of imports in Pakistan during the period 1965-68. Further, we try to establish the relationship, if any, between underinvoicing of imports and the kind of import control policies followed by th Pakistani government during that period. Our conclusion is that some of the commodities whose import was restricted by the government were in fact being underinvoiced during that period.

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Finally, I would like to thank the various participants of the International Trade Workshop at the University of Western Ontario, where some earlier drafts of a few of the thesis chapters were presented.

The University of Western Ontario   Munir A. Sheikh
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CHAPTER I

INTRODUCTION

In some less developed countries, smuggling is an important economic problem. It is a recognised form of international trade. Simkin (1970), for example, estimated that 30% of the foreign trade of Indonesia is channelled through smuggling. For Afghanistan, Smith (1969) estimates such a ratio to be about 25%. There are also reportedly large flows of smuggled goods to and from India, Pakistan, Afghanistan, Turkey, Phillippines, Ghana and many other African and Asian countries.

Many countries have restrictive trade policies. These policies tend to curtail legal trade but smuggling being an illegal trade activity may thrive with these restrictions on trade. The theory of international trade has dealt with the question of trade restrictions at great length, but has until recently completely ignored the effects of these trade restrictions on the illegal trade, smuggling. Because many of the less developed countries have intervened in their foreign trade sectors in an effort to accelerate development, these policies tend to create incentives for smuggling. The issue of smuggling is of considerable importance (at least for such less-developed countries where smuggling takes a major proportion of total foreign trade) in reassessing the effects of these

restrictive trade policies on total import demand and export supply, welfare, domestic prices and domestic production.

This dissertation will try to answer various questions regarding the theoretical implications of the presence of smuggling and then an extension of the theoretical framework will be undertaken to study the problem of smuggling in Pakistan.

We shall first focus our attention on the factors responsible for creating incentives for smuggling. Smuggling incentives for a good are created if there is a price differential between the foreign market and the domestic market for that good. In Chapter II, we shall examine some possible incentives for smuggling which are created by any kind of government policy. These policies like foreign trade restrictions and exchange control will be discussed to determine the extent to which incentives for smuggling are created by these policies.

In Chapter III, we shall try to establish equilibrium in the market for a single imported good in the presence of smuggling in the context of a partial equilibrium framework. This good may be legally imported, domestically produced or smuggled in. We shall attempt to establish the prices and quantities of the good coming through all these sources. Even though any of the policies mentioned in Chapter II may induce smuggling, Chapter III shall discuss only the case where the price

divergence between the domestic and foreign markets is created by an import tariff.

Chapter IV is an extension of the partial equilibrium framework to the general equilibrium analysis of smuggling. Here again, an attempt is made to determine the equilibrium prices and quantities bought, produced, imported and smuggled of a good subject to an import tariff. In this chapter we shall also discuss the effects of smuggling on domestic production, consumption, total import demand, domestic prices of the exported and imported goods and welfare.

The existence of exchange control creates incentives for smuggling and illegal capital flows. Smuggling being an illegal trade activity, which might involve both the imported and exported goods could generate the demand for and supply of foreign exchange outside the scope of the controlled official market of foreign exchange. Illegal capital flows also affect the demand for and supply of extra legal foreign exchange. In Chapter V, we study the issue of the black market for foreign exchange in this context. Beginning with a discussion of the working of the black market for foreign exchange, we make a comparison of the black market exchange rate with the equilibrium exchange rate in the absence of any exchange controls to find out if the black market rate can be a guide to the equilibrium exchange rate or not. The effect of exchange control on capital flows and total current account use of

foreign exchange (legal plus illegal) is also studied in
the presence of a black market for foreign exchange.
Further, the effects of an import tariff on the black mar-
ket exchange rate, capital flows, total current account
use of foreign exchange and total official supplies of
foreign exchange are also considered in the above frame-
work.

In Chapter VI, we undertake an investigation of
the problem of underinvoicing of imports in Pakistan.
Underinvoicing of imports is a technique of smuggling
which we have defined above as illegal imports or exports
of any goods. If the imports of any commodity are under-
invoiced, it simply means that the value of declared im-
ports is less than the value of the actual imports of that
commodity. Hence we have some illegal imports of that
commodity. We include a total of thirty-six commodities
in our analysis of underinvoicing of imports in Pakistan
for the period 1965-68. As the incentives to smuggle in
a commodity are created when imports of that commodity are
restricted, we make an effort to relate the underinvoicing
of imports in Pakistan to the kind of import control
policies followed by the government during that period.
The technique utilised to determine whether the under-
invoicing of imports exists or not is the technique of
partner-country trade data comparison first used by
Bhagwati (1969) to analyse the existence of underinvoicing
of imports in Turkey.

CHAPTER II

INCENTIVES FOR SMUGGLING

In this chapter, we shall be concerned with the issue of how different government policies create an incentive for smuggling. By incentives we mean that entering into illegal trade brings some gains to either or both the smuggler and the consumers of the smuggled good.

Anything that creates a price divergence between the foreign market and the domestic market for any good creates an incentive for the smuggling of that good provided that this divergence does not exist because of some costs in trade (such as transportation costs which create a price divergence between the foreign and the domestic market)[1].

Foreign Trade Policies

There are three major kinds of trade distortions which can create incentives for smuggling. First, different kinds of trade restrictions in the absence of any exchange control will tend to create a divergence between the domestic and foreign prices of the good. These trade restrictions include various forms of import tariffs and

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1. All smuggling is simply one form of various tax (or regulation) evasions. Some taxes (or regulations) may apply to international transactions and others to domestic activities, and smuggling is evasion of those taxes (or regulations) which affect the foreign sector. Hence the various cases discussed in this chapter may simply be regarded as special cases of the general issue of tax (or regulation) evasion.

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import subsidies, export taxes and export subsidies, and import and export quotas. Second, in the absence of any direct trade restrictions, the prevalence of exchange control with the official exchange rate fixed at some disequilibrium rate can create a black market for foreign exchange and hence a difference in the domestic and foreign prices of some goods. The multiple exchange rate system is a variant of these exchange restrictions and leads to different degrees and directions of price differential between the foreign and domestic market for various traded commodities. Third, state trading monopolies can create an incentive for smuggling, if they choose to exercise their monopoly power.

The above factors are briefly explained below. To examine the implications of these various distortions separately, we shall assume throughout our analyses, unless otherwise specified, that there exists only one such distortion at a time.

1) <u>Import Tariffs and Subsidies, Export Taxes and Subsidies</u>.

In the presence of any kind of above-mentioned trade restrictions, the relationship between domestic and foreign prices in terms of domestic currency can be written as

$$(2.1) \qquad P = P^*(1 + \tau)$$

where P is the domestic price and P^* is the foreign price of the good in terms of domestic currency. The price divergence between the two markets is given by

$$(2.2) \qquad P - P^* = \tau P^*$$

where τ is a rate which stands for either an import tariff, import subsidy, export tax or export subsidy. For an import tariff and export subsidy $\tau > 0$; and for an import subsidy and export tax $\tau > 0$.

Using (2.2), we can derive the following results.

a) If a tariff is levied on the import of some good, (2.2) is positive, and the foreign price is lower than the domestic price. This gives rise to an incentive to smuggle the good into the country to avoid paying the import tariff.

b) In the case of an import subsidy (2.2) is negative, making the foreign price higher as compared to the domestic price. Thus there is an incentive to smuggle that good out of the country. The units of the good actually smuggled outward may be the imported units and/or those produced domestically if there exists any such domestic production[2].

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2. This whole chapter is based on partial analysis. We have concluded above that if an importable is subsidised, incentives are created for its outward smuggling and disincentives for inward smuggling. It should be added that an import subsidy in this kind of analysis can be expected to create incentives for overinvoicing of imports (i.e. the declared value of the imports of a good is greater than its actual import value to collect a greater amount of subsidies). In a general equilibrium kind of framework, the problem is complicated and one can not derive such a simple conclusion. For a detailed discussion on this point, see Chapter V, Part I and Chapter VI, Part III.

c) For an export tax (2.2) is again negative, hence creating an incentive to sruggle the good out.

d) In the case of an export subsidy (2.2) is positive, thus creating an incentive to smuggle in the good.

2) Import and Export Quotas.

Quotas may be used either to set a ceiling (maximum limit) for imports and exports of goods, in which case legal trade may be below the level of market-determined import or export of the good, or to set a floor (minimum limit) for imports and exports (they might require subsidisation) which if fulfilled may increase imports and exports above the market-determined level.

Quotas setting a binding ceiling on imports and a floor on the exports of a good create a divergence between the foreign and domestic price levels in the direction of a higher domestic price as compared to the foreign price. This would create incentives for inward smuggling of the goods.

Quotas setting a floor for imports and a ceiling for exports may lead to a lower domestic price as compared to the foreign price, and thus create an incentive for outward smuggling.

3) Exchange Controls.

If the official exchange rate is fixed at a point where it is not the equilibrium exchange rate and exchange controls are employed, a black market for foreign

exchange may develop where the transactions of currency take place at an exchange rate different from the one pegged by the exchange control authorities[3].

Let r^0 stand for the official exchange rate as the units of domestic currency per unit of foreign currency and r^b for the corresponding black market rate. Let the relationship between r^0 and r^b be given by,

$$(2.3) \qquad r^b = r^0(1 + \alpha)$$

where $\alpha = \dfrac{r^b - r^0}{r^0}$, which denotes the proportion by which the black market rate differs from the official rate. The relationship between the price of a good in terms of foreign currency (P^f) and its price in terms of domestic currency (P), through legal channels, is given by

$$(2.4) \qquad P = r^0 P^f$$

If a good can be traded by obtaining a black market cover of foreign exchange, then the world price of the good in terms of domestic currency through the illegal channels (P_s) is given by

$$(2.5) \qquad P_s = r^0(1 + \alpha)P^f$$

Subtracting (2.5) from (2.4) we have

$$(2.6) \qquad P - P_s = -\alpha r^0 P^f$$

To the extent that the black market and official market exchange rates diverge (i.e. $\alpha \neq 0$) there exists a price differential between the two markets.

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3. We are leaving aside the issues involved in the determination of the black market equilibrium until Chapter V.

If $\alpha > 0$, indicating a relatively higher price of foreign exchange in the black market compared to the official market, (2.6) < 0. For an export commodity, the exporters would find it possible to obtain a higher price in terms of domestic currency through the black market for foreign exchange as compared to the domestic price or the price through the official foreign exchange market. Then there would exist an incentive to smuggle the good out in order to sell the foreign exchange thus obtained on the black market.

In our above discussion we assumed that the price of the exportable is fixed in terms of foreign currency. Another possibility is that it might be fixed in terms of domestic currency regardless of the channel, legal or illegal, through which it is exported, and the foreign importer having the option to import it either legally or purchase a foreign exchange cover in the black market for his imports. In that case, instead of (2.4) and (2.5), we have,

$$(2.7) \qquad P = r^0 P_\ell^f$$

$$(2.8) \qquad P = r^0 (1 + \alpha) P_s^f$$

where P_ℓ^f and P_s^f represent the foreign prices of the good in terms of foreign currency through legal and illegal channels.

Subtracting (2.8) from (2.7) we have

$$(2.9) \qquad P_\ell^f - P_s^f = \alpha P_s^f$$

If $\alpha > 0$, (2.9) > 0, so that the foreign importer may find it profitable to use the black market for

foreign exchange for the transaction.   Then $\alpha > 0$ (i.e. $r^b > r^0$) creates incentive for outward smuggling of the export good of the country practising exchange control.

However, between these two extremes, prices may not be fixed in terms of either the local currency or foreign exchange, in which case, we have

$$(2.7) \qquad P = r^0 P_\ell^f$$

$$(2.10) \qquad P_s = r^0 (1 + \alpha) P_s^f$$

subtracting (2.10) from (2.7), we have

$$(2.11) \qquad P - P_s = r^0 [P_\ell^f - (1 + \alpha) P_s^f]$$

If $\alpha > 0$, then as long as $P_\ell^f < (1 + \alpha) P_s^f$, (2.11) > 0, and there is an incentive for outward smuggling. In this situation, a good may be smuggled out even if, in terms of _foreign_ currency, the exporter receives a lower price through smuggling than he can receive through legal trade (i.e. it is possible that $P_s^f < P_\ell^f$, even though $r^0 (1 + \alpha) P_s^f > r^0 P_\ell^f$ as $\alpha > 0$).   Further, in the case that $P_s^f < P_\ell^f$, the foreign importer also gains by paying a relatively lower price for purchasing the smuggled good.

In the case of an import commodity, if $\alpha > 0$, from (2.6) we find that anyone importing smuggled goods has to pay a higher price as compared to the price of legal imports.   This creates disincentives for inward smuggling.   Similarly, from (2.9) we find that $P_\ell^f > P_s^f$, hence foreign exporters would be induced to send their goods legally.   However, if $\alpha < 0$, the opposite will hold

true.

The above analysis leads to the conclusion that a higher price of the foreign exchange in the black market as compared to the official market creates an incentive for outward smuggling and is a disincentive to inward smuggling[4]. The opposite holds if the black market price of foreign exchange is lower than the official price. However, this conclusion is correct only if exchange control is the sole form of trade restriction. But exchange control may also be combined with some form of tariff or quota restrictions.

Consider, for example, a commodity whose imports are subject to a tariff, so that the domestic legal price of the good is given by

$$(2.12) \qquad P = r^0 p^f (1 + t)$$

where t is the advalorem rate of import tariff. The price of the smuggled good, assuming its foreign price to be fixed in terms of foreign currency, is given by

$$(2.5) \qquad P_s = r^0 (1 + \alpha) p^f$$

subtracting (2.5) from (2.12), we have

$$(2.13) \qquad P - P_s = r^0 p^f (t - \alpha)$$

If $\alpha > 0$, and $t > 0$, we no longer get the simple result, derived above, that this form of disequilibrium in

4. If $\alpha > 0$, incentives exist to overinvoice imports because the extra foreign exchange purchased from exchange control authorities at the official exchange rate can be sold in the black market at a higher exchange rate, thus generating pure profits for those engaged in such operations.

official exchange rate creates disincentives for inward smuggling. As long as $t > \alpha$, (2.13) > 0, so that there are incentives for inward smuggling. The analysis can be easily extended to cover other forms of trade restrictions combined with exchange control.

4) Multiple Exchange Rates.

Instead of fixing a unique rate of exchange for all exports and imports, the government may have different official rates of exchange for different commodities (i.e. there may be a set of r^0's instead of a single r^0). Then for any ith commodity, we can rewrite (2.6) as

$$(2.14) \qquad (P_i - P_{si}) = -\alpha_i P_i^f$$

where $\alpha_i = (r^b - r_i^0)/r_i^0$, and $i = 1, 2 \ldots n$, and n is the number of different official exchange rates.

For all commodities having $\alpha_i < 0$, there will be an incentive for inward smuggling of the goods and a disincentive for outward smuggling. For all other commodities which have $\alpha_i > 0$, there will be an incentive for outward smuggling or a disincentive for inward smuggling of those goods. And for all commodities having $\alpha_i = 0$, no incentives for smuggling are created.

5) Trading Monopolies.

The government may introduce a state trading monopoly, requiring the traders of a good to trade through such a monopoly, as an alternative device to other forms of trade restrictions. It may introduce any type of

price differential between the foreign and the domestic markets if it does not exactly replicate the perfectly competitive market situation.

The trading monopoly may act as an ordinary monopolist by equating marginal revenue with marginal cost in trade. In the case of imports, this trading monopoly would then buy a good at its world price (which can be called its marginal cost), and sell it to the point where the marginal revenue by the sale of an extra unit is exactly equal to the world price of the good[5], which gives the monopoly equilibrium as

$$(2.15) \qquad P^* = P[1 - \frac{1}{\eta}]$$

where η is the elasticity of domestic demand for the importable commodity. Equation (2.15) can also be written as

$$(2.16) \qquad (P - P^*) = P^* [\frac{1}{\eta-1}]$$

As $\eta > 1$, $P > P^*$, so that incentives exist for inward smuggling and disincentives exist for outward smuggling.

In the case of an export good, we have, for monopoly equilibrium

$$(2.17) \qquad P^* = P [1 + \frac{1}{\varepsilon}]$$

where ε is the elasticity of supply of exportables. For positively sloped supply curves $\varepsilon > 0$. Rewriting (2.17)

---

5. This is exactly equivalent to a revenue maximising tariff as this trading monopoly maximises its revenues.

we have

(2.18) $(P-P^*) = -P/\varepsilon$

As (2.18) < 0, $P^* > P$, which creates incentives for outward smuggling.

Domestic Sector Policies.

The domestic sector policies of the government may also create incentives for smuggling. Take, for example, the case of an indirect tax which is collected from the consumer. In that case the price received by the domestic producer of a good equals that received by the foreign producer, but the domestic price to the consumer is higher than the corresponding world price of that good. This might create an incentive for inward smuggling of that good. Similarly, indirect subsidies to consumers can create incentives or disincentives for inward or outward smuggling.

Capital Transfers.

If the government restricts or prohibits capital transfers from the country, but people want to transfer funds abroad anyway, then two ways are open to them. They can either purchase the foreign currency in the black market and transfer it abroad, or they can smuggle goods out. It is very likely that they will select the method which is more profitable.

Suppose a person wants to transfer an amount Y of domestic currency abroad. Then the purchase of foreign exchange in the black market gives him the amount

of foreign exchange as

(2.19)
$$Y_b^f = \frac{Y}{r^b}$$

where Y_b^f is the foreign currency purchased in the black

market.

If he can purchase some commodity i domestically

and smuggle it abroad, he can get the amount of foreign

currency as

(2.20)
$$Y_s^f = \frac{P_i^f Y}{P_i}$$

where Y_s^f is the foreign exchange earned through smuggling

out the good i, worth Y in terms of domestic currency.

Subtracting (2.19) from (2.20), we have

(2.21)
$$Y_s^f - Y_b^f = [\frac{P_i^f}{P_i} - \frac{1}{r^b}] \, Y$$

Any commodity i, for which $\frac{P_i}{P_i^f} > r^b$, it may be

advantageous for the person desiring a capital transfer

to enter into outward smuggling[6]. This shows how capital

transfers may be directly linked to smuggling.

In sum, there is a great variety of ways in

which incentives for smuggling can be created. All in-

volve some form of distortion in which a divergence is in-

troduced between the domestic and foreign prices.

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6.   The selection of one of these methods for capital
transfers would also depend upon the relative costs in-
volved in these two options, such as the risks in smuggling
goods as compared to risks in operating in the black market.

CHAPTER III

A PARTIAL EQUILIBRIUM ANALYSIS OF SMUGGLING

As discussed in detail in Chapter II, import
tariffs or subsidies, export taxes or subsidies, quotas,
exchange controls, etc., can all create incentives for
smuggling.   In the partial equilibrium framework of this
chapter, however, we take up the case of a single impor-
table commodity whose imports are subject to a tariff, and
then allow for the smuggling of this commodity.   We shall
then be interested in:

a) the price of the smuggled imports;

b) the quantity of the smuggled imports;

c) the price of the legal imports;

d) the quantity of the legal imports;

e) the price of the output domestically
produced;

f) the quantity of the output domestically
produced.

In this chapter, we retain the usual assumptions
of the partial equilibrium analysis that the supply and
demand schedules of a commodity are unaffected by the
general equilibrium repercussion of changes in income,
exchange rate and prices of other goods.   In addition, we
assume;

1) Consumers face risks in the purchase and use of the

smuggled good, either because of the existence of law
enforcement or because of the moral standards of society.

2) On the supply side, the suppliers of the smuggled good
are assumed to face costs in smuggling which include the
real resource costs and the costs to cover the risk in
smuggling.

3) If the consumers make a switch to the market for a
smuggled good from the legal market of that good (or vice
versa), they are assumed to keep constant the amount of
their expenditures on the purchase of that good.

4) There is perfect competition both in the legal market
and the market for the smuggled good.

5) The country is small and hence a price-taker in the
world markets.

Throughout our analysis, all prices are expressed
in terms of domestic currency.

Now suppose that our country puts a tariff on the
imports of the commodity under discussion. Then given
this tariff on the imports of this good, in Part A we
derive the demand curve for the smuggled good. In Part B,
we derive the supply curve of the smuggled good. Putting
together the supply and demand curves we find the proper-
ties of equilibrium in the presence of smuggling. Part C
introduces a qualification to the results derived in
Part B by introducing the possibility of redundancy of
tariff. In Part D, we discuss the special case of
monopoly in smuggling, and also consider the comparative

static effects of changes in tariff and law enforcement.

A. Demand Curve for the Smuggled Good.

The quantity demanded of the smuggled good in our
model is a function of the price differential between the
legally imported or domestically produced good and the
smuggled good. In our most general analysis, we assume
that the existence of law enforcement, risk attitude of
the population, the moral standards of the society and
imperfect knowledge of gains in smuggling ensure that a
very small price advantage in the market for a smuggled
good over the legal market for that good does not com-
pletely eliminate legal trade in that good. Depending
upon the risk attitude of different sections of the popu-
lation and the existence of government law enforcement
which tends to check smuggling, and thus creates this risk,
a given price differential will induce a group of people
to trade in the market for the smuggled good who feel that
the advantage is worth the risk undertaken. A greater
price differential brought about by a change in either the
legal price or the price of the smuggled good will in-
duce a greater diversion from the legal market to the
market for the smuggled good. This happens because of
the different risk attitudes of different people towards
law enforcement and greater price differentials leading to
more and more people feeling that the gain is worth taking
the risk. This means that the greater the risk aversion
of a consumer, the greater is the price differential

required to induce him to switch to the market for the smuggled good from the legal market.

In Fig. 3.1, ED is the usual excess demand curve for the commodity in the absence of smuggling, which is derived by subtracting the domestic supply from domestic demand at every domestic price for the good. With free trade, the world price P^* also prevails domestically which leads to P^*d^* imports from abroad.

Now a tariff is imposed on imports which raises the domestic price of the commodity to P_0 in the absence of smuggling and reduces its imports to $P_0 d_0$. We introduce smuggling in our model through our curve B. This curve is a substitution curve which indicates at a particular price, P_1^S, in the market for the smuggled good, the quantities of purchases switched from the legal to the illegal market is an increasing function of the price in the legal market. Thus, at the domestic tariff-determined price P_0 in the legal market, and a price P_1^S in the market for the smuggled good, the quantity $P_0 b_0$ of this good formerly purchased in the legal market is switched to the purchase of smuggled imports. This curve does not show us quantity demanded of the smuggled good as a function of its own price or the legal import price because the amount which will be demanded at a lower P_1^S price of the smuggled good as compared to a legal price P_0 will not necessarily be the same as the amount not-purchased-now in the legal market.

The slope of this B curve depends upon various

Fig. 3.1

Fig. 3.2

factors mentioned before, namely, the extent of law enforce-
ment efficiency and the risk attitude of the population,
and other factors like the nature of the good, the chances
of its detection, etc.. For example, if law enforcement
was less efficient than that represented by B, then the
same price differential might lead more people to stop buy-
ing in the legal market. This is shown in Fig. 1 with the
curve B', which tells that the same price differential $(P_1^s -
P_0)$ induces people who were buying an amount $P_0 b_1$ in the
legal market to switch to the market for the smuggled good.

Given a certain risk attitude and a certain
level of law enforcement efficiency, we have a family of B
curves for every price of the smuggled good[1]. If the
price of the smuggled good is the same as the legal price,
then the existence of risk eliminates all smuggling, hence
we shall have one of a family of B curves originating from
P_0 (not drawn). If the smugglers can supply the good at
the world price, then we have a B curve originating from
P^* and labelled as B_1; showing that at this price and with
the given rate of tariff, the demand for a quantity $P_0 b_2$
from a legal market is being switched to the market for
the smuggled good, and only $b_2 d_0$ will be demanded through
legal imports at the legal price P_0.

A higher tariff which raises the domestic legal

---

1. Only for the sake of simplicity, are we drawing all
our curves as straight lines. They may be drawn non-
linear without affecting our results.

price to P_1, induces a greater switching from the legal market to the market for the smuggled good on our assumptions. Out of a total import demand of $P_1 d_1$ in the absence of smuggling, $P_1 b_3$ is not being demanded any more in the legal market, given P^* as the price of the smuggled good. This leaves an amount $b_3 d_1$ to be satisfied through legal imports.

Now using the B curves and keeping the rate of tariff constant, we can derive the demand curve for the smuggled good. This is done in Fig. 3.2. At a legal price P_0, if the price of the smuggled good is also P_0, demand for the smuggled good is zero hence P_0 is a point on our demand curve for the smuggled good. Suppose the price of the smuggled good is P_a, then our B_2 curve says that the price differential $(P_0 - P_a)$ diverts quantity demanded to the market for the smuggled good from the legal market by an amount $P_a a_1$ where $P_a a_1 = P_0 a_0$. Successive lower prices of the smuggled good relative to a legal price P_0 generate greater and greater diversion of demand from legal market to the market for the smuggled good. At a P^* price of the smuggled good, the diversion is $P^* b_1$ which equals $P_0 b_0$. Joining all points like P_0, a_1, b_1, etc., gives us the $P_0 C$ curve, which shows diversion to the market for the smuggled good as a function of the price of the smuggled good, when legal price is kept constant at P_0.

However, $P_0 C$ is not the normal Marshallian type

of demand curve for a commodity as a function of its own price. It simply shows the diversion from the legal market. Reconsider a price like P_a. With this price of the smuggled imports, from our B_2 curve, we find that $P_a a_1$ of the quantity demanded in the legal market is switched to the market for the smuggled good. This would have been purchased in the legal market if no smuggling had existed. However, at a <u>relatively lower price</u> <u>of the commodity</u> in the market for the smuggled good (P_a, as compared to P_0) and given our assumption of constant consumer expenditures, some additional quantities of the good will be demanded. Furthermore, a lower price brings new consumers into the market who were not willing to purchase the commodity at the legal price P_0. The curve $P_0 C$ only shows the switching from the legal market. Thus we must add to the $P_0 C$ curve this extra demand generated by lower prices in the market for the smuggled imports. The addition of this extra demand to $P_0 C$ curve at every price of smuggled imports gives us the demand curve for the smuggled good - keeping all other things constant including the rate of tariff (and thus the domestic price of the good). Hence the demand curve for the smuggled good is $P_0 D^S$, for a given rate of tariff.

B. <u>Supply Curve of the Smuggled Good.</u>

We now have to derive the supply curve of the smuggled good to find an equilibrium in the legal market as well as in the market for the smuggled good. Under

perfectly competitive conditions in the market for the smuggled good, we can derive the supply curve by the usual procedure of summing up all the marginal cost curves of different suppliers at various prices of the smuggled good.

As already mentioned, there are two kinds of costs involved on the supply side, the real resource costs and the risk costs. On the side of the real resource costs, smuggling of the goods is not a costless affair. If the goods are carried on a small scale for smuggling purposes, the per unit cost of transporting the goods will be higher than in the legal trade. Instead of getting goods through cheaper sources like ocean going vessels, the smuggled goods may enter the country by small motor boats, or as in the case in Afghanistan, "the camel is the primary carrier of goods but profits from smuggling make it difficult to direct caravans to domestic transport"[2]. Special storage facilities may have to be constructed to keep the goods away from the anti-smuggling staff. Smuggling activity may also require certain fixed costs before any goods may be carried through the borders illegally.

Furthermore, the smugglers face the risk of being fined, punished or their goods being confiscated.

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2. Smith (1969).

Along with the real costs, the smuggler must also be able to cover these risk costs in smuggling if smuggling is to be profitable.

The supply curve of the smuggled good is C'S in Fig. 3.3. The vertical axis represents the market price of the smuggled good and the horizontal axis represents its supply. Under perfectly competitive conditions, for a given price of the smuggled good in the domestic market, the smugglers will supply the good up to the point where the marginal cost in smuggling plus the price at which they purchase the good themselves in the world market is equal to its price in the domestic market. It is positively sloped on our assumption of rising marginal cost in the smuggling industry[3].

The Equilibrium

We now combine the supply and demand curves for the smuggled good in Fig. 3.4 to find the equilibrium in the legal market and the market for the smuggled good. The intersection of the supply and demand curves for the smuggled good occurs at E_0[4]. Note the following proper-

---

3. It is conceivable that C'S may be horizontal (representing constant costs) or downward sloping (indicating decreasing costs in smuggling), because either or both of its components, the real costs and risk costs may be a constant or a decreasing function of the amount of smuggling. This does not affect our analysis as long as the equilibrium in the market for the smuggled good is stable. (See footnote 5).
4. It is conceivable that because of secrecy in the sale of the smuggled good, there may be small segmented markets for the smuggled good. In that case, our analysis may be considered representing one of these many segmented markets.

P,P^S

C'
P*

0   Fig. 3.3   Q

P,P^S

P'_e

P_j

b_0   s_0   d_0
P_0

P_s   E_0   S
C'_0
C'
P*
b_1   b*   s*   D^S
C   d*
ED

0   Fig. 3.4   Q
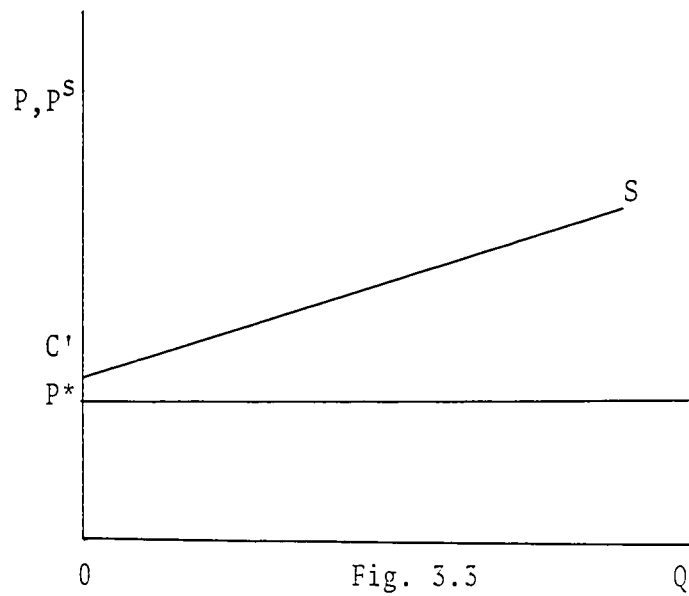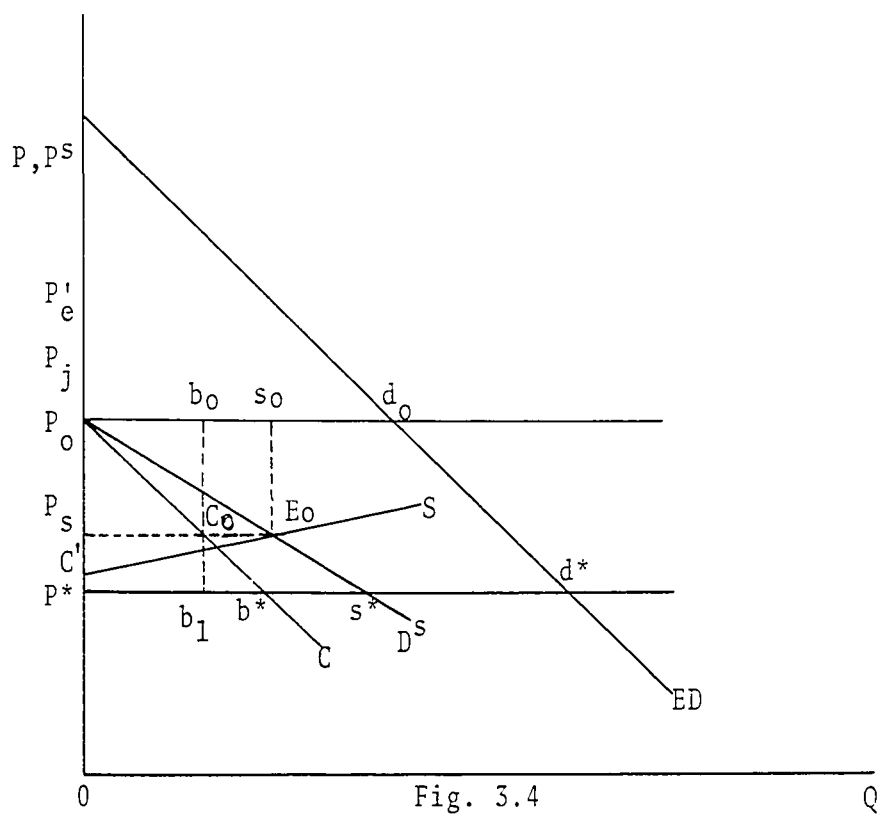
ties of this equilibrium:[5]

a) The price of the smuggled imports is P_s.

b) The quantity bought and sold of the smuggled imports is $P_s E_0$.

c) The price P_0 which is the tariff inclusive price prevails in the legal market; and the price of the smuggled good P_s is less than this legal price.

d) The curve $P_0 C$ shows us the switching of the quantity demanded from legal market to the market for the smuggled good. Thus out of a total amount demanded $P_0 d_0$ of legal imports in the absence of smuggling at the legal import price of P_0, the quantity $P_0 b_0$ is now switched to the market for the smuggled good, and thus only $b_0 d_0$ is being demanded in the legal market. The difference between the smuggled good purchased $P_s E_0$ and the amount switched from the legal market $P_s C_0$ ($= P_0 b_0$) is increased demand for this good due to the presence of

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5. Smuggling in this case would only take place if $OC' < OP_0$ in Fig. 3.4. If $C'S$ is horizontal, indicating constant costs, the condition $OC' < OP_0$ is again required for smuggling to exist. If $C'S$ is negatively sloped (representing decreasing costs in smuggling), it would never touch the $P^* d^*$ line, if these costs are assumed never to approach zero. If, then, $OC' < OP_0$, equilibrium in the market for the smuggled good would be unique and stable. If, however, $OC' > OP_0$ smuggling can not exist if $C'S$ is everywhere outside $P_0 D^S$. But if $C'S$ intersects $P_0 D^S$, smuggling can exist in this case even if $OC' > OP_0$. However, there will now be two equilibria instead of one, one stable and the other unstable.

smuggling. Thus smuggling has increased
total import demand.

e) As the domestic producers can sell all they
    want to produce at the tariff inclusive
    price, they will take P_0 as the price they
    face in the market.

f) As long as the price faced by the domestic
    producers remains the same, quantity produced
    by them is the same even in the presence of
    smuggling.

g) Government loses tariff revenue by an amount
    $P_0 b_0 b_1 P^*$; which is equal to the switch from
    legal imports to smuggled imports times the
    rate of import tariff.

C. Redundancy of Tariff.

In Fig. 3.1 (and 3.2), we were careful in
drawing the B_1 curve in such a way so that at some rate of
tariff such as the one giving P_0 as the domestic legal
price, the curve passes through a point like b_2 on the line
$P_0 d_0$ to the left of d_0; and then traced out the $P_0 C$ curve
from the family of B curves. We saw that this situation
provides us with equilibrium in both the legal market and
the market for the smuggled, good where in legal market the
tariff inclusive price prevails.

If we assume that there are no costs on the supply
side of the smuggled good, P^* would be the constant price

of the smuggled good.[6]   What if the slope of B_1 curve in
Fig. 3.1 is such that the point b_2 is to the right of d_0
at the price P_0?   This would mean that the quantity
switched from the legal market is more than the total
import demand at that price.   The same problem arises if
the tariff inclusive price goes above the intersection
point of B_1 and ED at e.

The implications of such a situation are given
in Fig. 3.5.   At a legal price of P_e and a price of the
smuggled good P*, all the quantity which was to be deman-
ded in the legal market in the absence of smuggling is
completely switched to the market for the smuggled good
for this price differential, as shown by the intersection
of B_1 curve with ED curve at e(P*b* = P_ee).   Nobody is
purchasing any legal imports at this price any more.   A
tariff up to that point is helpful in raising the domestic
price.   However, after the domestic price has reached
P_e, nobody is willing to buy the legally imported com-
modity and any further increase in tariff is redundant
because there are no legal imports.   Then a tariff in-
clusive price P_0 can not be maintained if the slope of the
B curve is the one giving B_1 curve in Fig. 3.5.   Thus our
conclusions of Section B require a qualification.   Our

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6.   We are making this assumption to simplify our dia-
grammatic exposition of the issue of the redundancy of
tariff.   The analysis can be easily extended to the
general case by relaxing this assumption.

Fig. 3.5

results of that section crucially depend on the condition that tariff does not become redundant. After the point of tariff redundancy, no matter what the rate of tariff, no variable in our model like domestic price of the legal goods, domestic production, legal imports, etc., is affected by the tariff[7].

Thus we reach the important conclusion that if legal trade goes side by side with the trade for the smuggled good, then the domestic legal price prevails and protection of the domestic industry is not affected any-way. However, once legal trade is completely eliminated at some rate of tariff, no additional rate of tariff can provide greater protection to the domestic industry.

As Fig. 3.2 shows, the demand curve for the smuggled good in our simplified model originates where domestic price is given by the tariff. If the rate of tariff was increased from P_0 to give a domestic price P_j in Fig. 3.4, the D^S curve would have shifted up. Thus as the tariff rate is increased, the demand curve for the smug-gled good shifts to the right. But from Fig. 3.5 we know that further increases of tariff rate would not shift

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7. The conclusion depends to some extent on the shape of the B_1 curve. It is possible to construct a B_1 curve such that this result would not be possible. For example, one could assume that there will always be someone who is unwilling to buy the smuggled good, i.e. someone who is very risk averse.

points b* and s* in Fig. 3.4 once a comparable price P_e' like P_e of Fig. 3.5 has been established, because there is no further effect on switching on demand from legal market to the market for smuggled good.

We now have to determine the location of point s* in Fig. 3.5. s* would always lie to the left of d* as long as the B curve is positively sloped. Consider a price like P_e prevailing both in the legal market and the market for the smuggled good. A 'B' curve would originate from P_e, and there would be no smuggling and the quantity demanded of legal imports would be $P_e e$ (= P*b*). If legal price now falls to P*, so that a tariff has been eliminated, quantity demanded of the legal imports increases from P*b* to P*d*.

But now suppose the price of the smuggled good falls to P*, so that nobody purchases in the legal market. Again quantity demanded increases because of a lower price, but because of the risk attached in using the smuggled good, quantity demanded will increase less than it would have if the legal price had decreased. Thus s* lies to the left of d* and to the right of b* depending upon the elasticity of demand for the smuggled good as a function of its own price[8].

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8. In the usual case, where it is not costless to supply the smuggled good, a given rate of tariff would lead to a smaller diversion of import demand from legal market to the market for the smuggled good as compared to the no-cost smuggling situation. A higher tariff rate would thus be required to completely eliminate legal imports in the presence of these costs; hence the limit beyond which tariff becomes redundant is higher the higher these costs in smuggling.

D. Some Comparative Statics and Special Cases.

1. Change in Tariff.

Consider the consequences of a change in the tariff. In Fig. 3.6, a certain increase in the rate of tariff (if the tariff is not redundant) from the domestic price P_0 shifts the curves $P_0 D^S$ and $P_0 C$ to $P_1 D_1^S$ and $P_1 C_1$ respectively.

We find that

a) the switching from legal market to the market for the smuggled good increases from $P_0 f_0$ to $P_1 f_1$. The legal imports decrease from $f_0 d_0$ (with $P_0 f_0$ extended to d_0) to $f_1 d_1$.

b) the price for the smuggled good rises from P_0^S to P_1^S. This happens because of rising marginal costs in smuggling.

c) the quantity demanded of the smuggled good at the domestic legal price P_1, given rising supply curve of the smuggled good, is increased from $P_0^S E_0$ to $P_1^S E_1$.

d) the total import demand due to an increase in tariff decreases, but by less than what would have occurred in the absence of smuggling. This happens because of the existence of the market for smuggled good, due to which some consumers do not decrease their demand for the good who are purchasing in that market only and do not care about tariff. However, if the tariff does not become redundant, some consumers who are still purchasing in the legal market decrease their import demand as tariff increases.
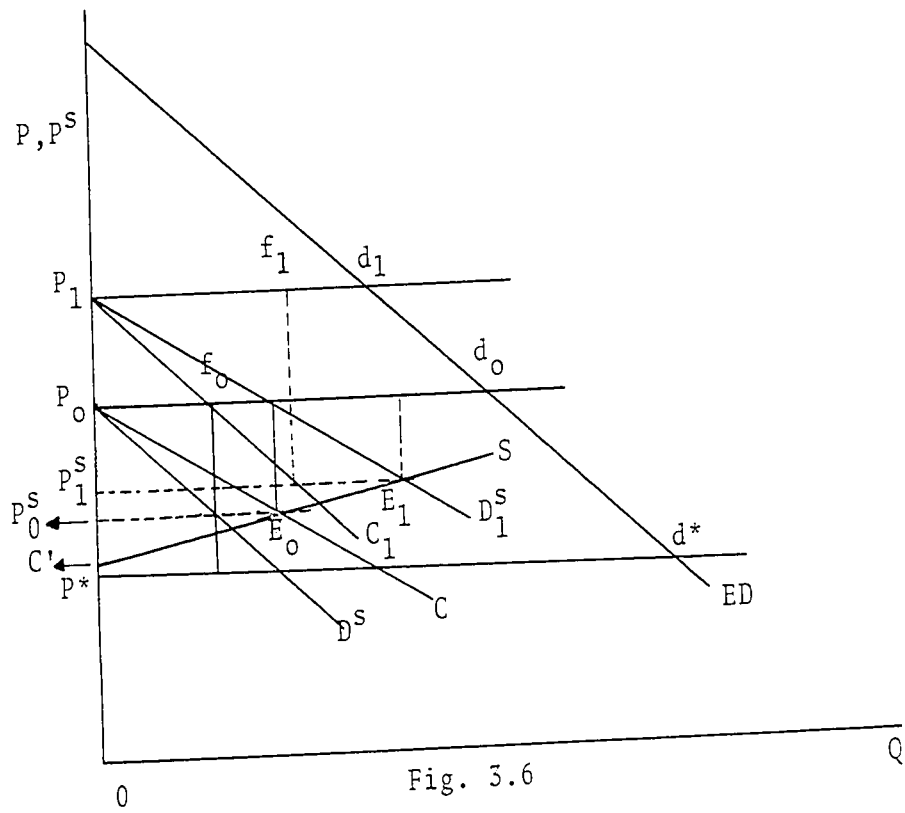
Fig. 3.6

2. Change in Law Enforcement.

The effect of a change in law enforcement is shown in Fig. 3.7. To be able to make a comparison with the effects of an increase in tariff rate, we assume that the government is interested in reducing import demand, and thus tightens law enforcement.

As risks in using the smuggled good increases for the consumers, the family of B curves become less flat and rotate as B to B' from the origin P^*. This also rotates the P_0C_0 curve to P_0C_1 making it less flat (recall that P_0C_0 curve is derived from our B curves). D_0^S will rotate to the left, say to D_1^S for two reasons. First, because of the rotation of P_0C_0 curve, which is a part of D_0^S curve, and second, because of the fact that successive lowering of the price of the smuggled good will bring in smaller additional demand for it due to tightened law enforcement. Furthermore, as suppliers also face increased risks, their marginal costs in smuggling rise, thus rotating C'S to C'S'. Equilibrium now occurs at E_1 instead of E_0. We note the following effects.

a) Switching of quantity demanded from the legal market decreases from P_0b_0 to P_0b_1 for a given rate of tariff. This has the corollary that, in the presence of tighter law enforcement, complete switching of demand from the legal market to the market for the smuggled good can take place only at a higher rate of tariff. This further implies that the limit beyond which tariff becomes redun-
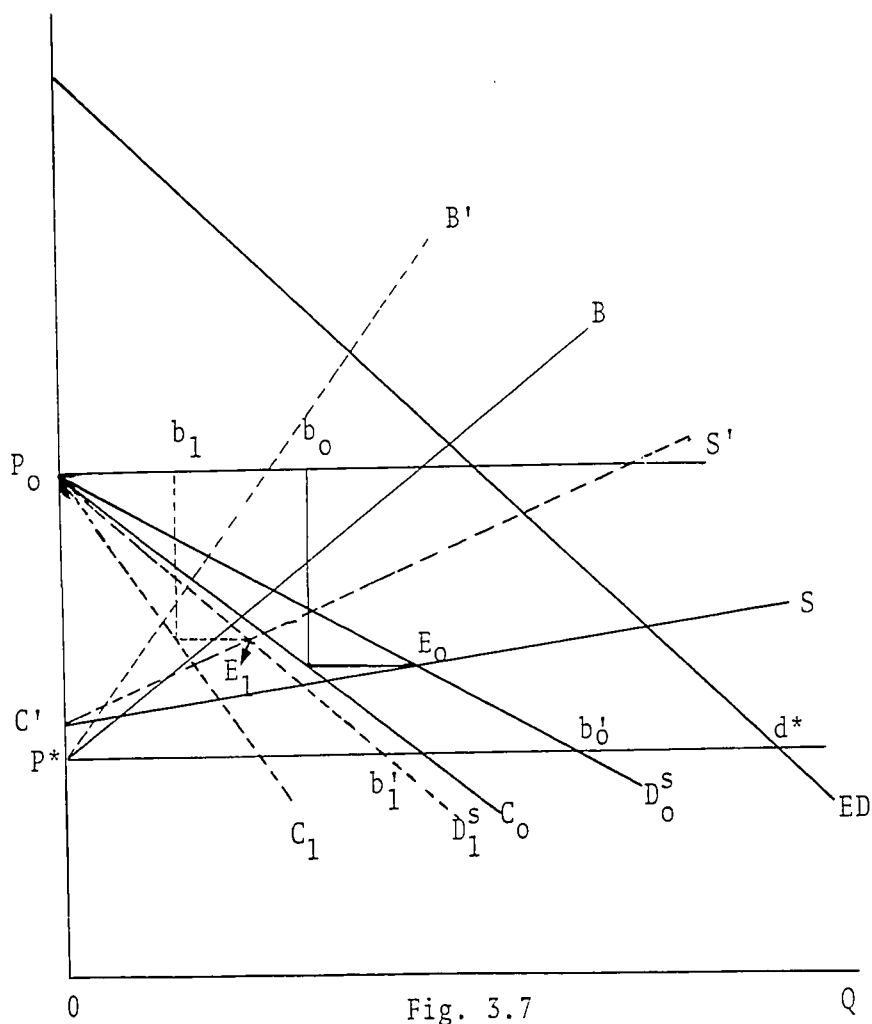
Fig. 3.7

dant will increase with tightened law enforcement (see discussion Part C). The implications are that if the government wants to give protection to some domestic industry at a rate higher than the one at which tariff becomes redundant, a policy of tightening law enforcement may make that tariff rate effective by raising the redundancy limit.

b) Price of the smuggled good may rise, fall or remain constant. This happens because an increase in risk increases the cost to the supplier and thus decreases quantity supplied at the same price. But quantity demanded also decreases for a given price. The effect on price would thus depend upon the relative extent of the shift of the two curves.

c) Tightening of law enforcement will increase tariff revenues as evasion from legal market decreases.

d) Total import demand due to improved law enforcement falls. This is because switching now takes place from the market for the smuggled good to the legal market, but a higher price there would tend to choke off some of the existing demand.

3. Monopolist Smuggler.

We now relax our assumption (4) of perfect competition in smuggling and assume that there is a monopolist smuggler. The monopolist smuggling case is shown in
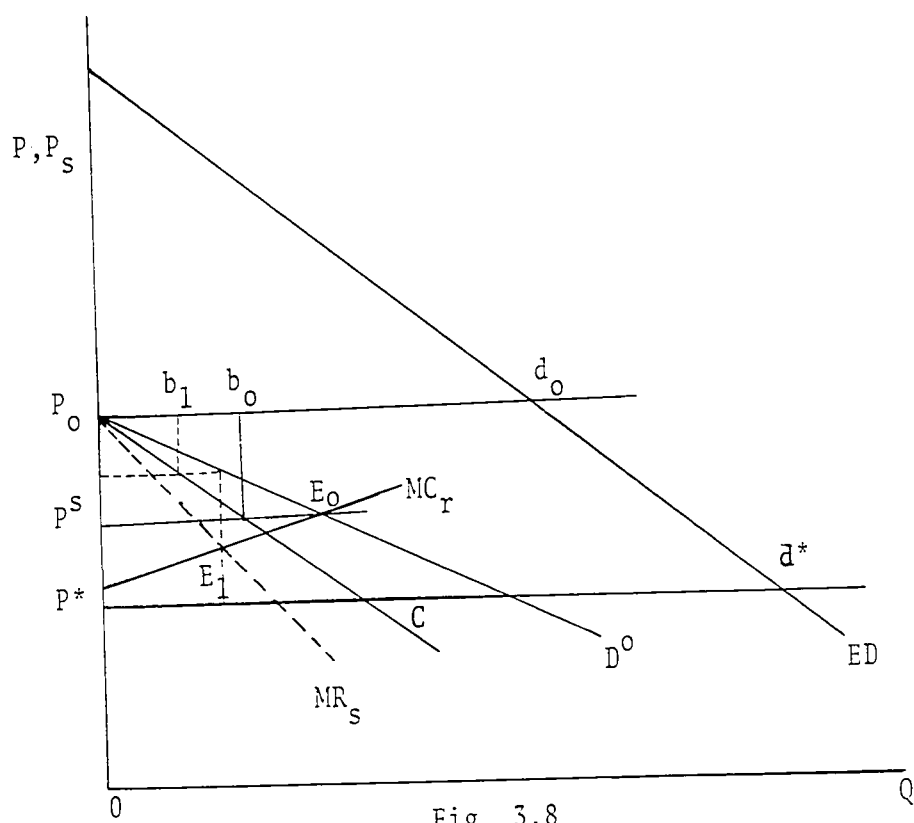
Fig. 3.8

Fig. 3.8. We draw the MR_s curve which is the marginal revenue curve faced by the monopolist smuggler. Instead of the supply curve of the smuggled good under perfect competition, we have the marginal cost curve MC_r of the monopolist smuggler, where subscript r denotes that we are including risk costs also in the cost function of the smuggler. Equilibrium occurs at E_1 where $MR_s = MC_r$ giving the price of the smuggled good as P_s. From the P_0C curve we can find the switching from legal market as P_0b_1, leaving a legal import demand b_1d_0.

In the presence of perfect competition, equilibrium would have occurred at E_0, giving a switching of quantity demanded from the legal market of the magnitude P_0b_0. Thus the existence of monopoly leads to

a) a higher price of the smuggled goods, consequently leading to a small amount of quantity demanded and supplied of the smuggled good, thus decreasing total import demand;

b) reduced switching from the legal market from P_0b_0 to P_0b_1; and less loss of tariff revenue;

c) as the switching from the legal market is less for the same rate of tariff, the limit to which domestic price can be raised with the help of tariff increases (i.e. raises the limit beyond which tariff becomes redundant);

d) even in the presence of monopoly in smuggling, the price of the smuggled good must always be lower than the tariff inclusive legal price, as long as smuggling exists.

CHAPTER IV

SMUGGLING, PRODUCTION AND WELFARE

We now extend our partial equilibrium analysis of Chapter III to the case of general equilibrium. In this chapter, we shall be interested in the implications of introducing smuggling in the standard international trade model. This model assumes the production of only two consumption goods plus the smuggling activity, and only two factors of production are utilised in production. Factor supplies are given and production functions are assumed to be subject to constant returns to scale. Furthermore, there is perfect competition in both the product and factor markets. With the help of these assumptions, we are able to draw the usual transformation curve for the two consumption goods. On the demand side, utility is assumed to depend only on the quantities of goods consumed, and consumers' welfare depends only on personal consumption. Consumers are assumed to have preferences which can be represented by a set of community indifference curves.

By introducing smuggling into this model we add some other assumptions. In the present chapter we make the assumption that there is a balance of trade equilibrium

even in the presence of smuggling[1]. Smuggling is thus not

associated with capital flows. Furthermore, government

spends resources on various law enforcement activities and

smuggling being one of the illegal activities is also

affected by government law enforement policy. We shall

assume that the government is spending a fixed amount of

resources on law enforcement irrespective of whether there

is any smuggling or not. This is done to separate the

implications of trade restrictions on smuggling as changes

in government policy towards law enforcement could also

affect smuggling. The transformation curve is thus a net

transformation curve derived after a fixed amount of

resources have been taken away by the government by means

of direct taxation so as not to affect any prices[2].

We assume two countries in the world, the home

country and the rest of the world. Smugglers are assumed

to be residents of the home country. The rest of the

world supplies importables of the home country and demands

its exportables at a single terms of trade, thus making no

distinction whether it is dealing with the smugglers or

nonsmugglers. Smugglers thus receive the goods at the

international terms of trade and pay no import tariff.

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1. We are assuming that the value of the country's
"total" exports is equal to the value of its total imports.
We are not making any assumption that the value of smuggled
exports be separately equal to the value of the smuggled
imports.
2. For a discussion on this point see Musgrave (1959) and
Melvin (1970).

Any costs which are undertaken in smuggling are thus entirely inside the home country. We also assume perfect competition in smuggling industry. Auxiliary assumptions will be added wherever necessary.

Smugglers face two kinds of costs, the risk costs and the real resource costs[3]. In the presence of law enforcement by the government, smuggling entails certain risks. Risk cost includes the possibility of confiscation of smuggled goods, and punishment and fines for the illegal activity. Smugglers face such risks and are assumed to include them in their cost calculations.

The real resource cost is in terms of factors of production devoted to carry on smuggling. The existence of smuggling means that some factors of production are

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3. These are the only two costs included in the analysis. The utility to the population of tariff revenue received by the government may be considered more than the utility of the unpaid tariff retained by the smugglers. We, however, make no such distinctions in our analysis. Furthermore, the very act of smuggling as compared to legal trade may be considered morally wrong, thus smuggling activity as such may directly enter in the consumer's utility functions; whereas our welfare function ignores this by making welfare a function of the consumption of the two commodities. Smuggling may also affect the general attitude of the population towards other laws of the land, like payment of taxes, and may also lead to undermining the public's confidence in the government, if the government fails to take action against smuggling. If people loose confidence in the government, it may also affect their behaviour towards work, thus affecting production. These are socio-economic problems related to smuggling and are ignored in our simplified model. There are also some limitations of our two consumption good model. If many importable commodities are subject to tariff, the physical ease of smuggling some as compared to others may induce distortions in domestic production (or reduce them).

devoted to this business which otherwise would have gone
to other production.   To the extent that the smuggling
industry uses methods of transportation which are more
inefficient than in the legal trade, such as, transporting
goods through mountains and on donkeys and camels instead
of bringing them in big ocean-going vessels, the higher
transportation costs require additional use of resources in
smuggling as compared to legal trade.   The efforts of
those who are smuggling goods to defy customs and law en-
forcement staff means that resources are being switched
from their use in production of the consumable goods to
carry on smuggling[4].

The objectives of this chapter are as follows.
Introducing an import tariff from a situation of free
trade in a standard international trade model, and allow-
ing for smuggling, we shall compare the domestic produc-
tion, consumption and welfare level attained with smuggling
to the non-smuggling situation.   We shall also be interes-
ted in the effects of small changes in tariff on smuggling.

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4.   Our model is different from those used by Bhagwati
and Hansen (1973) and Bhagwati and Srinivasan (1972).
They assume that smugglers are not the residents of the
country imposing a tariff and hence whatever real costs
are undertaken in smuggling are outside the home country.
These real costs are reflected in a less favourable terms
of trade through smuggling.   Thus in the presence of smug-
gling the country faces two terms of trade, one in legal
trade and the other in smuggling.   Furthermore, they im-
plicitly assume that smuggling is a completely riskless
affair.   As is shown in the next few pages, this dif-
ference in assumptions changes some of their results fun-
damentally.

Finally, we demonstrate that a higher tariff in the presence of smuggling may be better than a lower tariff. Some of the interesting results are:

1) A tariff on the importable commodity may lead to a reduction in its production, associated with a reduction, constancy or even an increase in the production of the exportable commodity.

2) Smuggling by using real resources and even in the presence of legal trade may increase welfare.

Throughout our analysis, we shall maintain the assumption that the country under consideration is a small country, which takes the prices prevailing in the world market as given, and is thus unable to affect the terms of trade.

I. The Model

In Fig. 4.1, the axes respresent the only two factors of production available, capital and labour denoted by K and L respectively. $\bar{M}$ and $\bar{X}$ are the two unit value isoquants for the two consumption goods in our model, M and X, the importable and exportable commodities respectively. They are drawn, given the price of two commodities in the world market with free trade and on the assumption of constant returns to scale. Associated with the free trade price ratio for these two commodities is the wage-rental ratio indicated as W_1.

An import tariff by increasing the domestic price of the importable commodity shifts the unit value
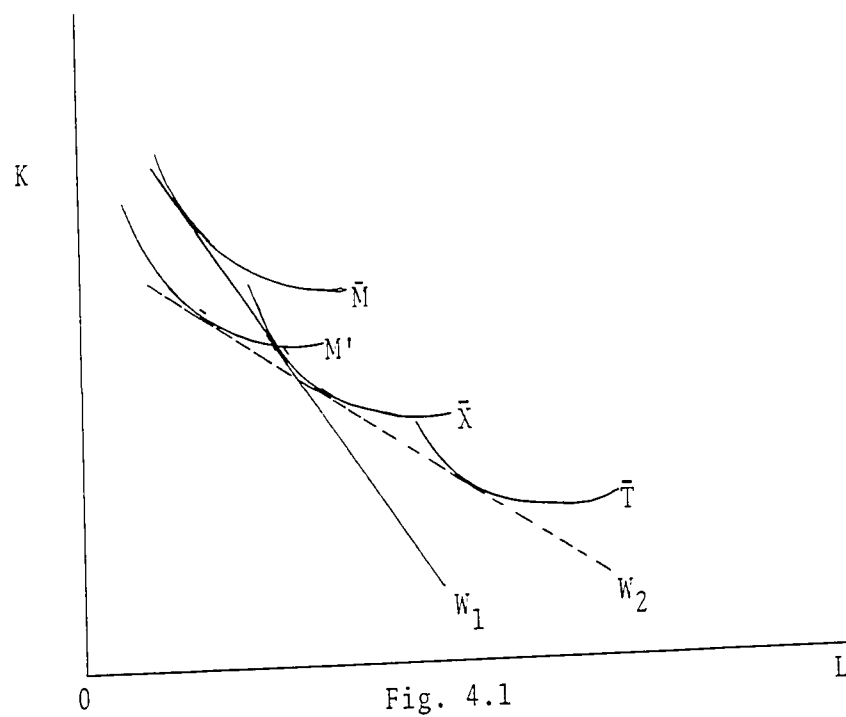
Fig. 4.1

isoquant for it from $\bar{M}$ to M' and changes the wage-rental ratio to W_2. As the import tariff leads to a divergence between the home prices and the given world market prices (assumed to be fixed), incentives are created for smuggling.

Let us assume that real resources are required in smuggling in the form of a transportation commodity, and name it for future reference as trucks denoted by T.[5] We further assume that T can be produced under conditions of constant returns to scale and that the ratio of the units of trucks required to smuggle a unit of M remains constant irrespective of the level of M smuggled. This means that if one unit of T is required to smuggle in ten units of M, five units of T will be required to smuggle in fifty units of M.

If the tariff is not redundant (a possibility which will be discussed later), then for the commodity price ratio for M and X given by this tariff we have the unique factor price ratio, and thus it will give a unique price of T in terms of the other two commodities at which it is just profitable to produce T. Hence the price of T will not be independently determined, and the $\bar{T}$ isoquant

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5. The T we are discussing refers only to the real costs in smuggling in excess of the normal transportation costs in legal trade.

tangent to the W_2 line must also be a unit value isoquant.

Thus we now have three commodities in our model out of which X and M are tradeables and T is a non-traded good solely produced to carry on smuggling. With free trade, there is no incentive to smuggle in commodity M, hence the production of T is zero.

We now have to determine the amount of smuggled imports, the amount of X, M and T produced and the distribution of total imports between legal and smuggled imports.

In our model with two factors and three goods, even though the price ratios are uniquely determined, the production mix of X, M and T is indeterminate as far as production possibilities are concerned[6]. If we can, however, determine the total demand for T given the price of T as determined by the production relations, we can find the output levels of X and M.

Let us define all prices in terms of X. Then for every unit of M smuggled, the smuggler gets[7]

$$P_r - P_r^* = tP_r^*$$

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6. For a discussion of indeterminacy in production with two factors and three goods, see Kemp (1969) pp. 135-38, and Melvin (1968).

7. This means that the smuggler can sell his good at the domestic price of the legally imported good. Thus we are implicitly assuming that the consumers are willing to pay the same price for the smuggled good as for the legally imported good, which further means that consumers face no risk in using the smuggled good, an assumption different from the one we made in Chapter III, where consumers also faced risks in using the smuggled good.

$$\text{because } P_r = P_r^*(1 + t) = P_r^* + tP_r^*$$

Where P_r is the domestic price of M in terms of X, and P_r^* is the corresponding world price[8], and t is the advalorem rate of tariff.

Fig. 4.2 is used to derive the demand curve for T on the basis of our assumption of increasing risk costs in smuggling. Let the amount of T required to smuggle a unit of M be called a unit of T. Then, on the horizontal axis, we have the units of smuggled M and T, bearing a fixed relationship with one another. On the vertical axis, we have the price of T in terms of X.

In this chapter, we shall assume that there are increasing risk costs in smuggling. By increasing risk costs we mean that the risk of smuggling a unit of a commodity in terms of confiscation of goods, fine and punishment, etc., increases as the total amount of smuggling increases.

Then with positive risk costs, the smugglers would not indulge in any smuggling at a price $tP_r^*(=P_r - P_r^*)$ per unit of T. At that price of T, their demand for T is zero, and thus we have a point on the demand curve for T. If the price of T is less than tP_r^*, say P_T, then for every unit of M smuggled in (M^S), the smuggler nets $tP_r^* - P_T$, and

---

8. We are using a subscript r to indicate that these are relative prices and to distinguish P_r and P_r^* from P and P* used in Chapters II and III as absolute money prices.

thus incentives for smuggling are created. Under competitive conditions, M will be smuggled in to the point where this per unit gain to the smuggler is exactly equal to the per unit risk cost in smuggling[9]. Suppose this point is reached when $P_T f$ units of M are smuggled in. By repeating this procedure, we can generate the negatively sloped demand curve for T, D_T in Fig. 4.2.

Now given the world prices of X and M, and for a given rate of tariff, we have a unique price of T in terms of X (let us call it P_T in Fig. 4.2), and a unique demand curve for T in Fig. 4.2. As long as the prices of X, M and the rate of tariff do not change, the price of T, which is P_T, will not change. Then at the price P_T of T, for the given rate of tariff, the equilibrium output level of T is T_0. This demand for T will be unique at the given rate of tariff and risk conditions in smuggling[10].

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9. To maintain the assumption of perfect competition in the smuggling industry, we assume that the smugglers have a knowledge of the risk costs in terms of good confiscated, fines and punishment levied. A smuggler takes these costs as given to him and can smuggle any amount of the imported good without affecting these costs. These costs are assumed to be increasing due to intra-industrial, inter-firm diseconomies of scale in smuggling (i.e. there are increasing risk costs if everyone tries to smuggle more; a single smuggler is unimportant to affect these costs).
10. Of course smuggling in this model will only take place if tP^*, e.g. the gain to the smuggler by smuggling in a unit of M is higher than the real per unit cost of smuggling. If, in terms of Fig. 4.2, tP^* is less than or equal to P_T, and there are risk costs also in smuggling, then smuggling will not take place.

Fig. 4.2
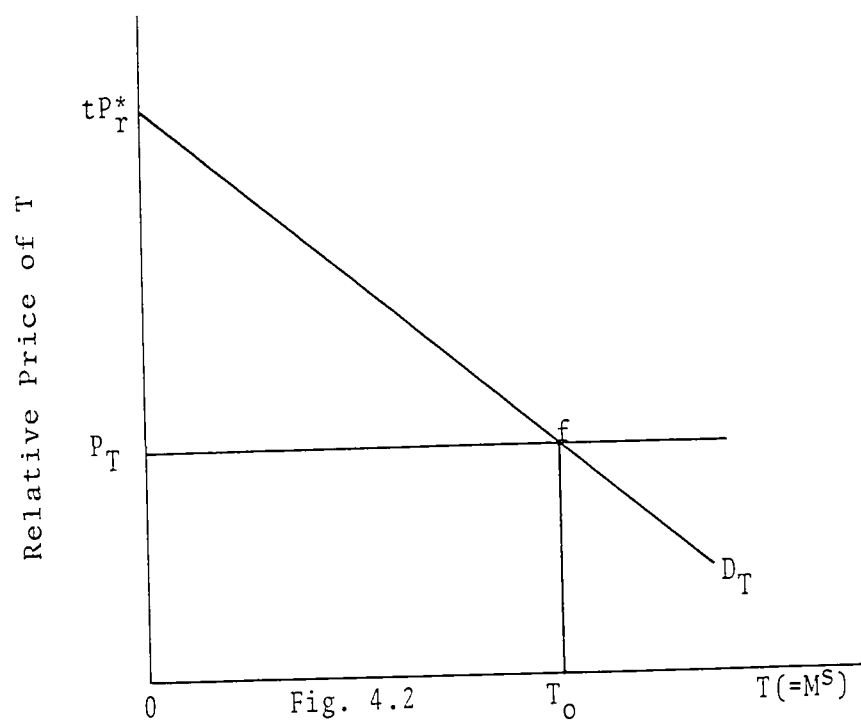
In the presence of smuggling, we are thus able to find the production level of T[11]. It is now a simple matter to determine the output levels of X and M[12]. This would, however, crucially depend upon the factor proportions used in T, the required commodity for smuggling.

If we let the capital-labour ratio in the production of M be higher than that in X, (and assume that there are no factor intensity reversals) there are five possibilities

1. $k_M > k_T > k_X$

2. $k_M > k_X = k_T$

3. $k_T = k_M > k_T$

4. $k_M > k_X > k_T$

5. $k_T > k_M > k_X$

Where k_i is the capital-labour ratio in the production of the ith commodity.

In the absence of smuggling, with a domestic commodity price ratio given by the world prices and the

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11. At the level of smuggling given by T_0, $tP_r^* - P_T$ is equal to the per unit risk cost of smuggling in terms of commodity X, and as the smuggler is a price taker, he takes this cost as given, as indicated in footnote 9. Then it is obvious that there are no pure profits in smuggling at the level of smuggling given by T_0, a condition for the existence of perfect competition.

12. Melvin (1968) showed that if one of the three goods is not traded then indeterminacy in production disappears. This is simply because another constraint is being placed on the model, namely that domestic demand equal domestic supply. This, of course, is exactly what we have done.

rate of tariff, full employment of factors requires a unique combination of the amounts of X and M produced. The presence of smuggling with that rate of tariff creates a Rybczynski type effect by diverting resources to the production of T.   Consider each of the possible cases.

1. Fig. 4.3 is a unit value isoquant diagram for the case where $k_M > k_T > k_X$. W_1 is the wage-rental ratio associated with the free trade price ratio.   E represents the amounts of capital and labour available.   Completing the parallelogram from E, using the capital-labour ratios for X and M in free trade gives us the production levels of X and M as X_1 and M_1 respectively.   A tariff is imposed, and in the absence of smuggling, using the new capital-labour ratios, associated with the new wage-rental ratio W_2, the new production points are X^* and M^*.

In the presence of smuggling, the output level of T is unique as shown above, and if it is represented by T_0 in Fig. 4.3, then we can find the amount of factors of production available for the production of X and M.   Oa represents the amounts of K and L used in producing T. When we subtract these from E, we get the new available supplies of K and L for the production of X and M as E_1. EE_1 will be parallel to Oa and also EE_1 = Oa.

Completing the parallelogram from E_1 with the given capital labour ratios (k_X' and k_M') we get the production levels of X and M in the presence of smuggling as X_s^* and M_s^* respectively.   It is obvious from the diagram

that the production of both X and M must be less in the

presence of smuggling as compared to the non-smuggling

production levels X* and M* respectively[13].

      Fig. 4.4 indicates the implications of this for

welfare. The production point in the presence of

smuggling is F' instead of F in[14] its absence[15]. In the

---

13.   It is further possible that if the amount of smuggling is considerable, and thus T uses large amounts of K and L, then the production point completing the parallelogram from a point like E_1 may give the production level of M like M_s^* such that it is on a lower isoquant than M_1, the free trade production point. This would then mean that a tariff from a free trade situation gives a production level of M which is actually lower than the free trade production level of M.

14.   Production point F' is located on the transformation curve Q'Q' drawn everywhere inside QQ which is the transformation curve in the absence of smuggling. Q'Q' in Fig. 4.4 is the locus of all efficiency points for the amounts of capital and labour represented by E' in Fig. 4.3 after an allowance has been made for the use of some resources in smuggling, and it can easily be derived by using the standard box diagram. The production point on this transformation curve will be the one where the tariff-determined price ratio is tangent to this curve, which, given the factor proportions condition in X, M and T, would mean lower outputs of both X and M as compared to those given by F, as is obvious from Fig. 4.3.

      For every different rate of tariff, and thus level of smuggling, there will be a different set of the amounts of K and L available for the production of X and M and hence a difference efficiency locus of their outputs and a different transformation curve. Thus only one point on each of these transformation curves is really attainable, as a change in tariff would also shift the curve along with the change in the domestic price ratio between X and M.

15.   Because of the use of real resources in smuggling, domestic production is shown to be affected by smuggling in our model. This is not the case in Bhagwati,-Hansen model (1973) or Bhagwati,-Srinivasan model (1972), where domestic production is not affected by smuggling until legal trade is completely eliminated.

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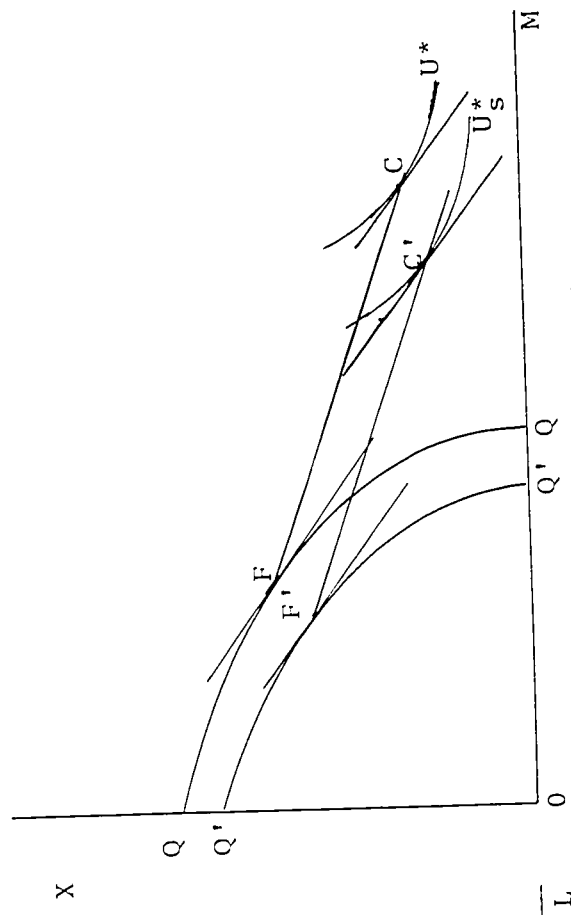
Fig. 4.4

Fig. 4.3
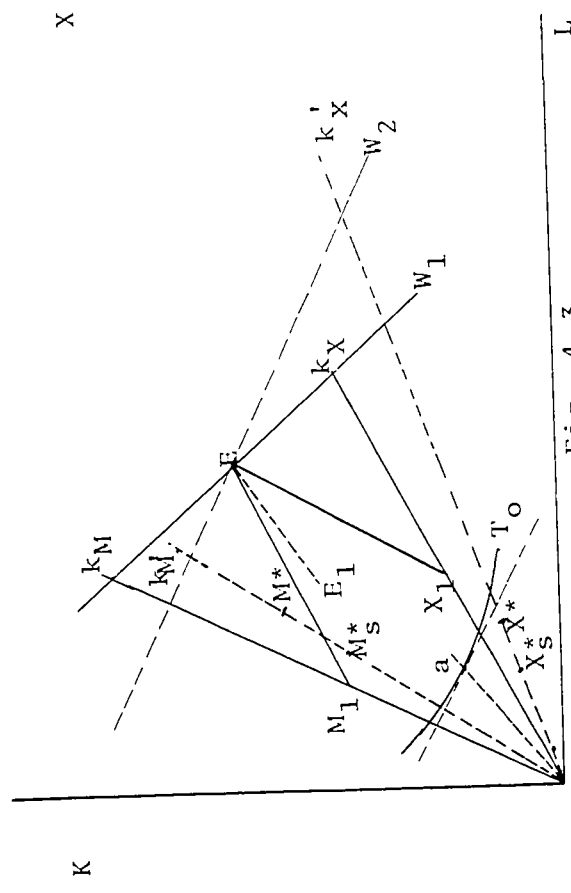
absence of any tariff redundancy (to be discussed later), and with given terms of trade, welfare level attained in the presence of smuggling is U_S^* as compared to U^* in its absence. The value of exports with given terms of trade is equal to the value of total imports, legal as well as smuggled, consistent with our earlier assumption of no capital flows associated with smuggling. Our model thus focuses on the distribution of total imports between smuggled and legal imports. The amount of smuggling is determined in Fig. 4.2, and the rest are legal imports.

As smuggling requires the production of T, which results in a decrease in the output of both X and M, a dead weight loss is generated, so that the welfare level in the presence of smuggling U_S^* is lower than the non-smuggling welfare level U^*[16]. In this case, smuggling reduces welfare.

For other possibilities, it can be easily shown that:

2. If $k_M > k_X = k_T$, then only the production of the exportable commodity X would be less in the presence of smuggling (i.e. $X_S^* < X^*$ and $M_S^* = M^*$). The welfare effect of this is shown in Fig. 4.5. The production point in the presence of smuggling is again F' as compared to F in its absence. It is obvious that the welfare level U_S^* is lower than U^*, thus indicating again that smuggling reduces welfare.

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16. We are making the assumption that tariff revenue is redistributed to the population.

3. If $k_T = k_M > k_X$, then only the production of importable commodity M would be less in the presence of smuggling (i.e. $X_S^* = X^*; M_S^* < M^*$).

The welfare effect of this is shown in Fig. 4.6. Production point is F' in the presence of smuggling as against F in its absence, and again welfare level $U_S^* < U^*$.

4. If $k_M > k_X > k_T$, then the production of M must be higher and of X lower in the presence of smuggling (i.e. $X_S^* < X^*; M_S^* > M^*$). Again smuggling reduces welfare, as $U_S^* < U^*$ in Fig. 4.7.

5. If $k_T > k_M > k_X$, then the production of X must be higher and that of M lower in the presence of smuggling as compared to the non-smuggling production levels of X and M (i.e. $X_S^* > X^*; M_S^* < M^*$)[17].

The welfare implications of this are not determinate. Fig. 4.8 shows the possibility that the welfare level may be higher in the presence of smuggling. Figures can easily be constructed to show otherwise. The reason for this indeterminacy can be traced to the inef-

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[17]. Bhagwati and Hansen (1973) and Bhagwati and Srinivasan (1972) have concluded that smuggling must always decrease welfare if legal trade is not completely eliminated. We have shown above that this may not always be true.
Note also the similarity between our model and various discussions of immiserising growth in a small country case. For example, our Fig. 4.8 can be used to illustrate one such case discussed by Johnson (1971). Growth shifts production point from F' to F and welfare level decreases from U_S^* to U^*, which thus represents immiserising growth.

X

F

F'

C

U*

U*_s

C'

0   M

Fig. 4.5

X

F

F'

C

U*

U*_s

C'

0   M
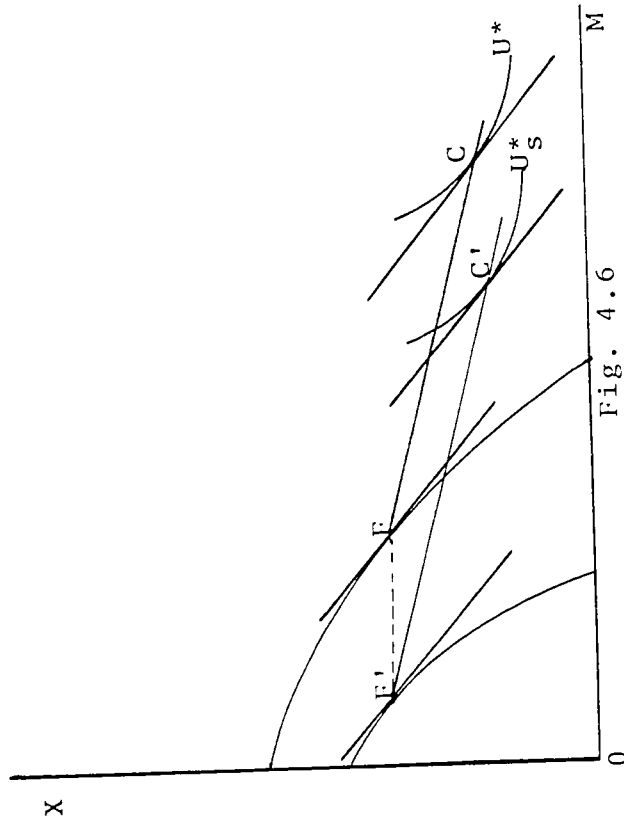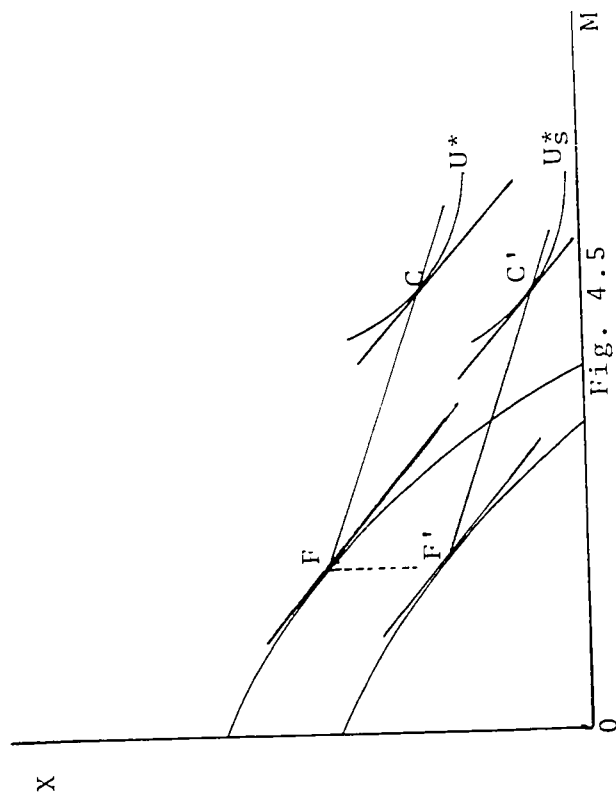
Fig. 4.6
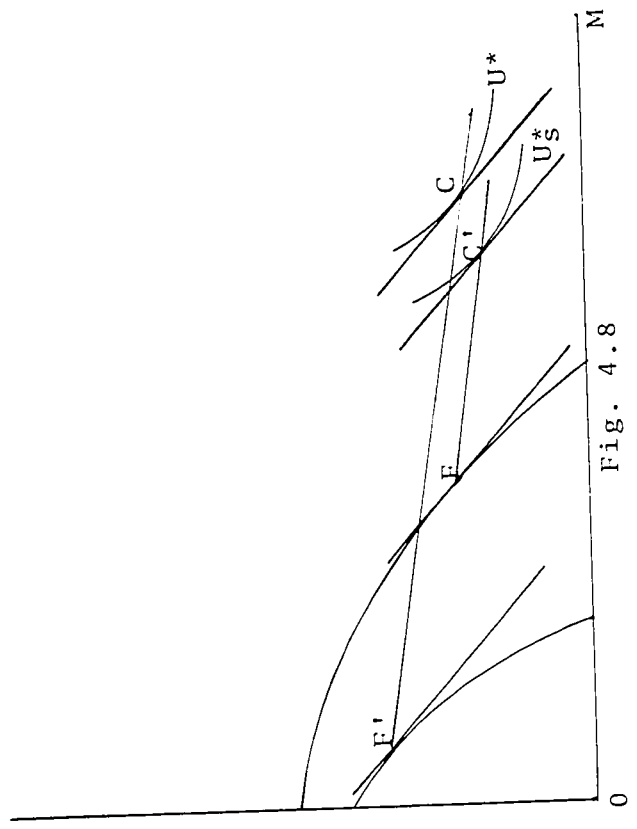
Fig. 4.7
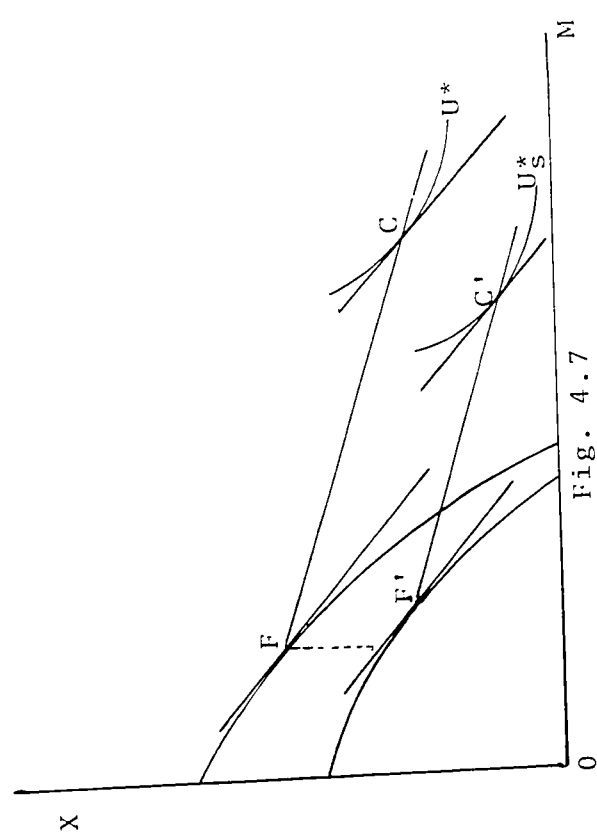
Fig. 4.8

ficiency of a tariff in a world where a country does not enjoy monopoly power in trade. A tariff always decreases welfare in this situation by reducing the output of the exportables and increasing those of importables whereas at the world prices, exportables are more valuable than the importables. As long as smuggling leads to a reduction in the production of either both the exportables and importables by diverting resources towards smuggling, or keeps one constant while decreasing the production of the other, smuggling decreases welfare by bringing about a net dead weight loss by using real resources. In the case where the production of importables is greater in the presence of smuggling, production inefficiency is added to the resource loss due to smuggling. Hence welfare decreases. However, if production of exportables increases and that of importables decreases in the presence of smuggling, the production inefficiency of a tariff is reduced, but a resource loss introduced. The first element tends to increase welfare, while the other tends to decrease it. Then their magnitudes may be such as to keep welfare constant in the presence of smuggling or increase or decrease it.[18]

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18. These various effects on production and welfare in our model exist because of the diversion of real resources (factors of production K and L) from the production of the two consumption goods towards smuggling, as smuggling is assumed to require transportation costs in excess of the normal legal trade transportation costs, in the form of T. If, however, this is not the case, so that T is not

II A Redundant Tariff

Our previous analysis of production and welfare
in the presence of smuggling depicted in Fig. 4.4 through
Fig. 4.8 was based on the assumption that the rate of
tariff on the basis of which those figures were drawn, was
not redundant. Let us return to Fig. 4.4. A movement
from the production point F' to consumption point C' is
accomplished by importing AC' of M, which consists of both
legal and smuggled imports. From Fig. 4.2 we can find the
quantity of imports coming in through smuggling, the rest
being legal imports.

Now, if at a particular rate of tariff, t*, the
amount of total imports just exactly becomes equal to the
amount of smuggled imports, there would not be any legal

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required for smuggling, no resources are diverted towards
smuggling and the transformation curve would not shift.
Smuggling would not then affect production and welfare
(in the absence of tariff redundancy, discussed later).
The only difference between the smuggling and the non-
smuggling situations would be that some imports would be
smuggled in, which otherwise would have been imported
legally. The amount of smuggled imports can again be
determined from Fig. 4.2 by equating P_T = o as the real
costs in smuggling fall to zero. The horizontal axis
would now represent only M^s, the amount of smuggled
imports as T is not required anymore. Rest of the import
demand is satisfied through legal imports.

Note that in this case also, legal trade and
smuggling can exist side by side and the tariff may not
be redundant. In the Bhagwati and Hansen (1973) and
Bhagwati and Srinivasan (1972) models, the condition of
zero real costs in smuggling would exactly replicate the
free trade situation, except that all trade would be called
illegal trade. No rate of tariff can then be effective
in their model in moving the economy away from the free
trade situation.

imports, and any <u>increases</u> in tariff shall not increase the domestic price of M. As a result, a tariff in excess of t* will not affect trade at all, or for that matter, domestic production. As defined in Chapter III, any such rate of tariff in excess of t* is thus redundant.

In this section, we shall derive the production and welfare effects of smuggling for such a redundant rate of tariff, where we assume, however, that in the absence of smuggling, this particular rate of tariff will be effective in changing production, imports and welfare. In other words, the tariff is not high enough to eliminate all trade. We shall consider only the case where $k_M > k_T > k_X$. The analysis can be easily extended to cover other possible cases.

Consider Fig. 4.9, where production points, F in the absence of smuggling and F' in its presence, are based on the rate of tariff t*, as defined above; so that total imports AC' are equal to smuggled imports in the smuggling situation. From our previous analysis, for the case where $k_M > k_T > k_X$, we know that F' represents lower levels of output of both X and M as compared to F, and the welfare level in the presence of smuggling is lower (i.e. $U_S^* < U^*$).

Now consider an increase in tariff. In the absence of smuggling the production point would shift from F to F_1, and the new welfare level attained is U^n. However, in the presence of smuggling, nothing changes
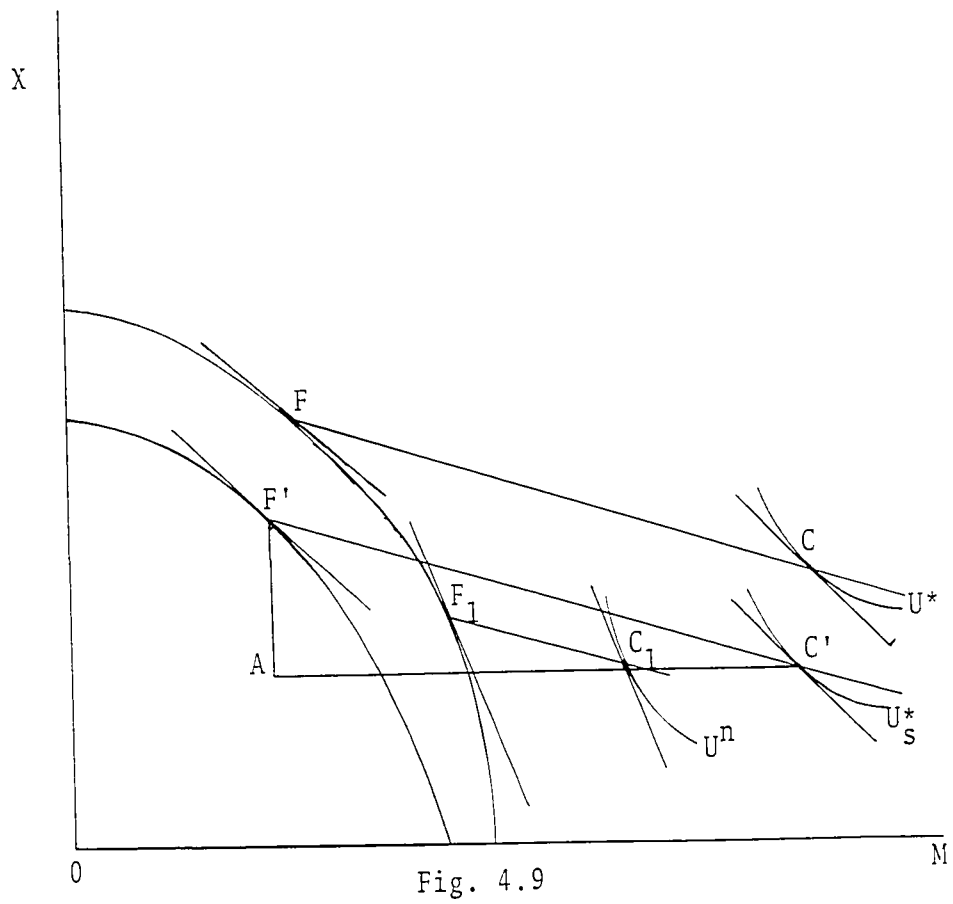
Fig. 4.9

because of the redundancy of tariff. The welfare level
U_s^* may be greater than, equal to, or less than the welfare
level given by U^n even though Fig. 4.9 shows only the case
where $U_s^* > U^n$. The production of M given by F' must be
less than that given by F_1. Production of X at F_1, how-
ever, may be higher than, equal to or lower than that
given by F'. Thus, if a tariff is in part redundant in
the presence of smuggling, our results of Part I regarding
the effects of smuggling on production and welfare do not
hold beyond the point of redundancy[19].

It can be easily shown that even for other
cases, the welfare level in the presence of smuggling can
not be uniquely ranked vis-a-vis welfare level in its
absence, for those rates of tariff which are redundant
in the presence of smuggling. However, the production
levels of X and M in the presence of smuggling as compared
to the ones in its absence would crucially depend upon the

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19. If smuggling does not require any additional trans-
portation costs such as the use of T, then F, C and U* in
Fig. 4.9 would represent both the smuggling and non-
smuggling situations (see footnote 18). If again, this
particular rate of tariff has eliminated all legal trade,
then any increases in tariff would not shift the produc-
tion, consumption or welfare points, F, C and U* respec-
tively in the presence of smuggling.
In the absence of smuggling, an increase in tariff
would shift the production point to F_1 and welfare level
to U^n. Then for the rates of tariff which are
redundant in the presence of smuggling, welfare level is
always higher in the presence of smuggling as $U^* > U^n$,
and production of M must be lower and of X must be higher
as is obvious from a comparison of F_1 and F.

relative factor intensities in the production of X, M and T.

Another point can be noted from Fig. 4.9. Once the tariff rate becomes redundant in the presence of smuggling, there are no further changes in the level of smuggling for tariff changes, indicating that there is a maximum limit to the amount of M which is smuggled, and hence a maximum inward shift of the transformation curve.

III Smuggling and Small Changes in Tariff

So far we have discussed the case in which a tariff is imposed from a situation of free trade, so that there is no initial smuggling and found that if the return to the smuggler per unit of smuggled M (which is the difference between the world and domestic price of M) is higher than the real per unit cost of smuggling, which in our model is the cost of trucks, there will be smuggling in the presence of a tariff. In this section, we try to find out how changes in the tariff will affect smuggling, if smuggling and a tariff already exist. We discover the possibility that an increase in tariff may actually reduce smuggling in our general equilibrium framework.

With our assumption that $k_M > k_X$, an increase in tariff on the imports of M will lead to an increase in the price of capital relative to labour. The price of T must also adjust with the change in the wage-rental ratio to the point where it is again just profitable to produce it.

How this price adjusts to the changes in wage-rental ratio depends upon the factor proportions used in the production of T.

Fig. 4.10 illustrates the point. If the tariff is increased, the wage-rental ratio changes from W_2 to W_3. For the case, where $k_M > k_X > k_T$, we see that for the T unit value isoquant to be tangent to the new wage-rental ratio W_3, the price of T in terms of X must fall until a price of T is reached where the output level of T indicated as T' is worth a dollar.

The effect on smuggling can be determined with reference to Fig. 4.2. A tariff shifts the D_T curve rightwards parallel to D_T because for any given level of smuggling under competitive conditions, the smuggler is willing to offer a higher price for T, the higher offer being exactly equal to the increase in the domestic price of M. With the cost of production of T going down from P_T in Fig. 4.2, we can infer that an increase in tariff increases smuggling. This has the corollary that increased tariff leads to an increase in the production of T and thus a greater diversion of the factors of production from the production of X and M towards T.

If $k_M > k_X = k_T$, and with the production function of T being the same as that of X, the unit value isoquant for T will coincide with that of X in Fig. 4.9. At the new wage-rental ratio, there will be no change in the price of T in terms of X. In terms of Fig. 4.2, even though

D_T would shift to the right, P_T will not change. Smuggling will then increase with increases in the tariff.

If $k_T = k_M > k_X$, and with the production function of T being the same as that of M, then the unit value isoquant for T in the pre-tariff-change situation coincides with M' in Fig. 4.10. To keep in line with the new wage-rental ratio, there must be the same percentage increase in the price of T as in the price of M, so that the new T unit value isoquant must again coincide with M.

If smuggling exists at all, $P_T < tP_r^* < P_r$ (see Fig. 4.2). It is clear that if the percentage change in P_T is the same as that in P_r due to an increase in tariff, the absolute difference between tP_r^* and P_T will increase[20],

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20. As can be seen from Fig. 4.2, the amount of smuggling of M depends upon the difference between tP_r^* and P_T and $tP_r^* - P_T = (P_r - P_r^*) - P_T$. To see whether this difference increases or decreases due to tariff, simply differentiating it with respect to t, we get

$$\frac{d}{dt}(tP_r^* - P_T) = \frac{dP_r}{dt} - \frac{dP_T}{dt} = \frac{P_r}{P_r}\frac{dP_r}{dt} - \frac{P_T}{P_T}\frac{dP_T}{dt} \qquad (1)$$

If the percentage increase in P_T is the same as that in P_r, which will be the case if $k_T = k_M > k_X$ and that M and T have identical production functions except for a scale factor, then

$$\frac{dP_r}{dt}\frac{1}{P_r} = \frac{dP_T}{dt}\frac{1}{P_T} ,$$

hence, (1) can be written as

$$\frac{dP_r}{dt}\frac{1}{P_r}[P_r - P_T] = \frac{1}{1+t}(P_r - P_T) \qquad (2)$$

For smuggling to exist $tP_r^* > P_T$; so that $P_r > P_T$; hence (2) > 0, indicating that an increase in tariff leads to an increase in smuggling.

Fig. 4.10
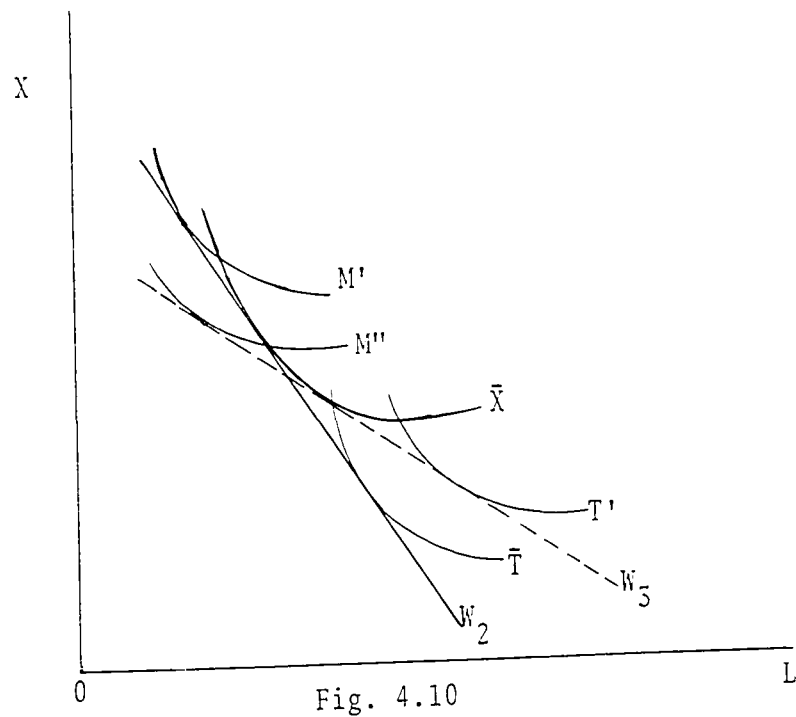
and as is obvious from Fig. 4.2, this will lead to an increase in smuggling.

If $k_M > k_T > k_X$, or if $k_T > k_M > k_X$, then as T is more capital intensive than X, an increase in the relative price of capital to labour makes it more expensive to produce T in terms of X. Hence, the relative price of T to X must rise. In this case, however, it is not possible to determine the percentage change in the price of T as compared to that of M. The percentage change in the price of T may be equal to or lower or higher than that of M. Then it is not possible to determine whether the absolute difference between tP_r^* and P_T in terms of Fig. 4.2 will increase or decrease. If the percentage change in P_T is greater than that in P_r due to an increase in tariff, then the absolute difference $(tP_r^* - P_T)$ may decrease (thus leading to a decrease in smuggling), remain constant, or increase[21].

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21. If, however, $\dfrac{dP_r}{dt}\dfrac{1}{P_r} = \lambda \dfrac{dP_T}{dt}\dfrac{1}{P_T}$, where $\lambda < 1$, (see footnote 20), instead of (2), we will have

$$\frac{dP_r}{dt}\frac{1}{P_r} [P_r - \frac{1}{\lambda} P_T] \qquad (3)$$

As $P_r > P_T$ for smuggling to exist, but $\lambda < 1$, the sign of $P_r - \frac{1}{\lambda} P_T$ is indeterminate; hence a tariff may lead to either an increase or decrease in smuggling.

Smuggling and Higher - vs - Lower Tariff

The existence of smuggling in the absence of
monopoly power in trade affords the possibility that an
increase in tariff may lead to an increase in welfare
rather than reduce it.   An increase in tariff in the non-
smuggling case leads to, what Johnson calls[22], production
and consumption losses, and thus decreases welfare.   In
the presence of smuggling, an increase in tariff may lead
to an increase or decrease in smuggling as shown in the
previous section.   We shall take up both these possibi-
lities.

If an increase in tariff leads to an increase
in smuggling, it will require more trucks to be produced
in our model, which increases the use of total resources
in smuggling, and tends to reduce the output of other com-
modities; this in itself reducing welfare.   However, it
is possible that the existence of smuggling may reduce the
production loss if a higher tariff leads to a reduction in
the production of importables and an increase in the pro-
duction of exportables.   For this we require the condi-
tion that the Rybczynski type effect of the diversion of
resources towards the production of T should be such as to
reverse the effect of higher tariff on the production of
importables.   This will happen, as shown in Section I, if

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22.   Johnson (1965) discusses in detail these production
and consumption losses.

the factor used more intensively in the importable industry
as compared to the exportable industry is used even more
intensively in the production of T, i.e. in our notation,
$k_T > k_M > k_X$.   If the Rybczynski effect outweighs the
price effect of a higher tariff on the production of M,
production of M will fall with higher tariff and that of X
will rise.   This will decrease the production loss.   If
this decrease in production loss outweighs the resource
loss due to smuggling and the consumption loss of a higher
tariff, an increase in tariff will lead to an increase in
welfare.

Such a possibility is shown in Fig. 4.11.   An
increase in tariff leads to production taking place at F_1
instead of F as resources move towards smuggling and wel-
fare level increases from U to U_1.   To illustrate other
possibilities, figures can easily be drawn to show that
even if the desired condition of capital-labour ratio in
smuggling is satisfied, welfare may still decrease or
remain constant depending upon whether the consumption
loss and resource loss due to smuggling is outweighed by an
increase in production efficiency or not.

An increase in tariff, if it reduces smuggling,
will lead to a decrease in the production of T, and hence
will release resources for the production of X and M.
This decrease in resource loss would in itself contribute
to an increase in welfare.   Depending upon the factor
intensity in the production of T, and thus the proportion

X

F1

F

U

U₁

O   M

Fig. 4.12

X

U₁

U

F

F1

O   M

Fig. 4.11
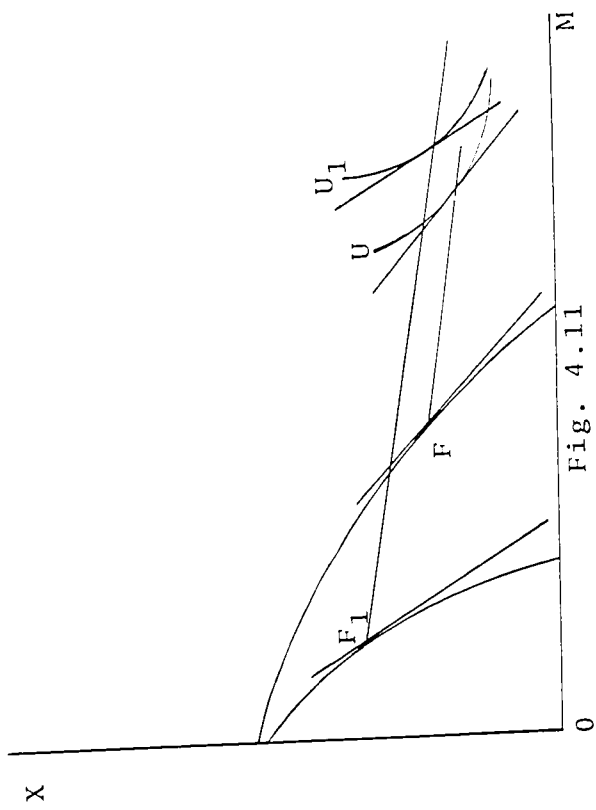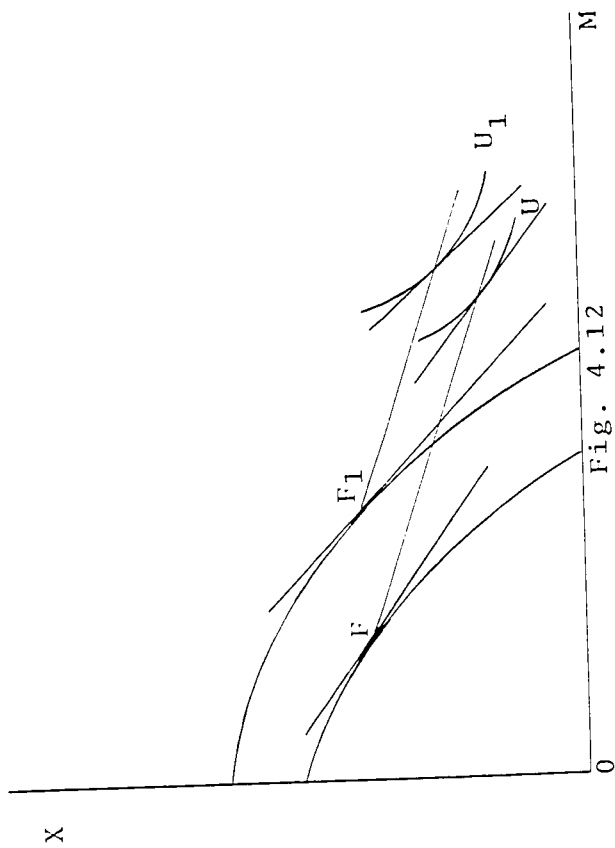
in which resources are released, production of M and X will also be affected by this Rybczynski effect along with the price effect of a higher tariff. Then these two effects on production may increase, decrease or keep constant the production loss, if they move in opposite direction; and will increase production loss if their direction is the same. The net effect of these consumption, production and resource gains and losses is thus uncertain. Hence, a higher tariff may lead to an increase, constancy or decrease in welfare.

Fig. 4.12 illustrates another case where an increase in tariff may lead to an increase in welfare. Production with the higher tariff takes place at F_1 and the initial production point is F_2. The welfare level with higher tariff U_1 is higher than U, the welfare level with the initial tariff. Figures can be easily constructed to show that the welfare level may have remained constant or decreased with higher tariff.

Conclusion:

This chapter examines the implications of smuggling for production and welfare. The direction of these effects is shown to depend upon the relative factor intensities in the production of other commodities vis-a-vis the production of a transportation commodity assumed to be solely produced for use in smuggling. Smuggling may increase or decrease welfare, and it is shown that a higher tariff may lead to a reduction, increase or constancy of

the production of the importable commodity. Further, in the general equilibrium framework, it is possible that an increase in tariff may increase or decrease smuggling, and that in the presence of smuggling, a higher tariff may be better than a lower tariff. We also briefly examine the implications for production and welfare of a rate of tariff such that it is redundant in the presence of smuggling but not in its absence.

CHAPTER V

BLACK MARKET FOR FOREIGN EXCHANGE

CAPITAL FLOWS AND SMUGGLING

In some less developed countries, a black market
for foreign exchange is as significant a phenomenon as the
controlled official foreign exchange market.   In this
chapter, we wish to study this issue of a black market in
foreign exchange and consider some of the related ques-
tions.   In Chapters III and IV, the only source of trade
distortion was assumed to be an import tariff.   However,
in the absence of exchange control, any other form of
trade distortion can not lead to the establishment of a
black market.   This is because,by definition, no controls
exist on the supply and demand for foreign exchange and
hence a free market can take care of all supplies and
demands.   Thus, even though an import tariff may lead to
smuggling, as discussed in Chapters III and IV, it can not,
however, lead to the establishment of a black market.
Hence to study the issue of a black market in foreign ex-
change, this chapter introduces exchange control as a form
of trade distortion.   We then consider a number of issues
which could not have been taken up in the kind of framework
of the previous two chapters.   The purposes of the present
chapter are:

1) to see how exchange control can create a black market

for foreign exchange. This is discussed in Part I where we have a diagrammatic analysis of the black market for foreign exchange.

2) to find whether the black market exchange rate is any guide to what the equilibrium exchange rate would be in the absence of any exchange control (defined as the rate at which foreign exchange market is cleared without any intervention by the government), given the existing set of other policies, such as trade taxes and aggregate demand. This is taken up in Part II.

3) to consider the effect of exchange control on the total current account use of foreign exchange. This use of foreign exchange will, by definition, be equal to total use of foreign exchange minus the capital outflow (Part III).

4) to introduce an import tariff in the above model (thus assuming that no import tariff existed in the model before) and to study its implications for the black market exchange rate, total current account use of foreign exchange and the supplies of foreign exchange to the exchange control authorities (Part IV).

The model used in this chapter is the simple text book case of demand and supply of foreign exchange based largely on the translation of markets for goods into foreign exchange markets. We, however, complicate it by introducing a black market. In addition to retaining the assumptions of this standard text book case (which will be stated below), we shall be adding auxiliary assumptions

where necessary.   The analysis of the black market for foreign exchange in this present chapter draws heavily upon the Michaely (1954) and Bronfenbrenner (1947) models of a black market for a single good in a domestic market.

At the outset, we should acknowledge the limitations of our model.   We have assumed away any distinction between the spot and forward exchange markets (and hence the functioning of speculation in these markets and arbitrage between the local and foreign markets).   We do not consider the effects of monetary changes related with balance of payments changes or changes in foreign exchange reserves and simply assume throughout our analysis that the government follows such policies as not to let any such changes affect the originally drawn supply and demand schedules of foreign exchange.   We thus eliminate the influence of changes in the money or bond markets affecting our analysis.   We also assume away any speculative or short-term capital movements.   Other assumptions in the course of our discussion would further illustrate the limitations of our analysis.   While we recognise that there is a need to have a full theory of foreign exchange black markets, this chapter is but a first step towards this goal even with all its simplifying assumptions.

I   The Model

i) Choice for the Authorities: Exchange Control - vs - Devaluation

In Fig. 5.1, the amount supplied and demanded of
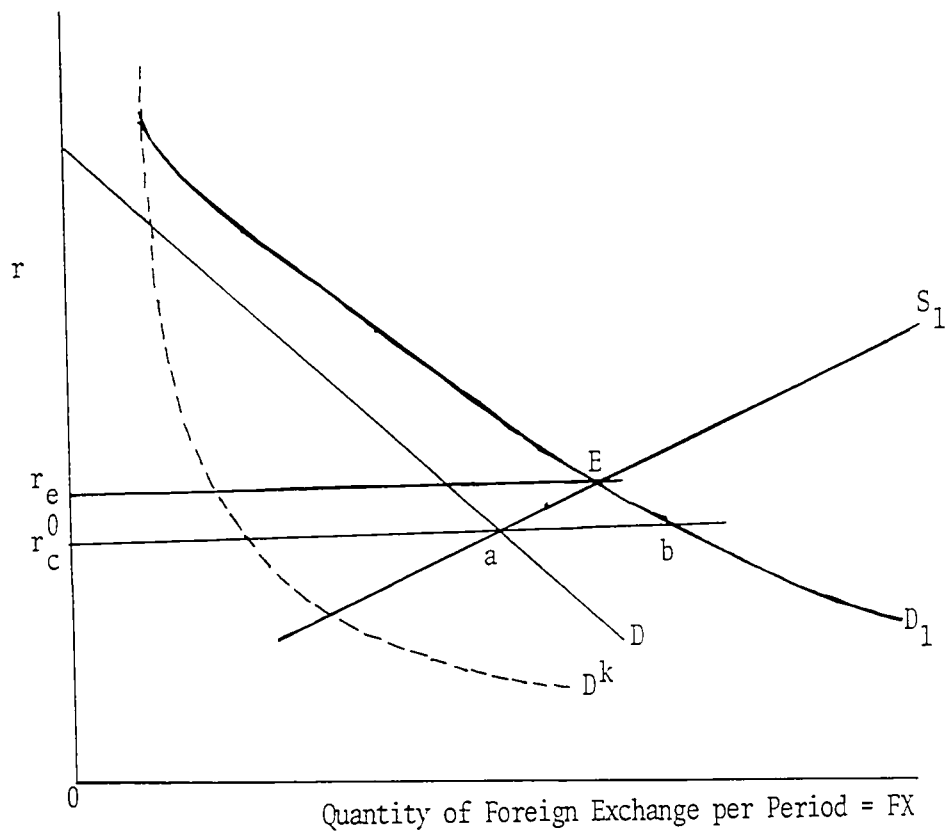
Fig. 5.1

foreign exchange per period is represented on the horizontal axis, and exchange rate on the vertical axis, where the exchange rate is the number of units of domestic currency per unit of foreign exchange. S_1 is the total supply curve of foreign exchange including both the current and capital account supplies. It is derived as a function of the legal exchange rate in the absence of any exchange control. It is based on the assumptions of a greater than 1 elasticity of import demand of foreigners for the exportables of this country, a non-zero elasticity of supply of these exportables, and a constant amount of capital inflow to this country which is independent of the exchange rate. On the demand side, D_1, the demand curve for foreign exchange[1], is derived by a horizontal summation of the curves D and D^k. The curve D, representing the current account demand for foreign exchange, is based on the assumption of a positive elasticity of supply of the importables of this country from abroad[2] (this curve, however, is not strictly dependent on an elasticity of import demand greater than 1). The curve D^k represents a constant amount of capital outflow in terms of local currency,

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1. For the sake of diagrammatic simplicity, these curves are drawn as straight lines.
2. The standard analysis of the foreign exchange market is well known from various discussions of the Marshall-Lerner condition. See, for example, Ellsworth and Leith (1969), Kindleberger (1963) or Meade (1951).

(thus having a unitary elasticity at every point) and is based on our assumption that capital outflows in terms of local currency are independent of the exchange rate.

The curve D^k represents the demand for foreign exchange for investment abroad and capital flight, where we define capital flight following Bloomfield (1954) as "...... those movements motivated by a desire to escape losses associated with such actual or anticipated phenomenon as war, communist [any kind] insurrection, high taxation, capital levies, internal economic collapse ... anticapitalistic milieus ..."[3]. While drawing this curve, we assume that for the period under consideration, the time is short enough not to make any appreciable changes in the factors mentioned above; hence given the circumstances, people want to transfer a certain amount of domestic currency abroad per period.

In Fig. 5.1, equilibrium in the foreign exchange market in the absence of exchange control and government intervention occurs at E, and the equilibrium exchange rate is r_e. This is then the exchange rate equilibrium in the absence of exchange control and use of reserves by the government.

Suppose the government was following a fixed exchange rate policy coupled with some given fiscal-

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3. Bloomfield (1954) p. 1 fn; see also pp. 17 and 18 for a discussion on capital flight. Expression in [] not in original.

monetary complex and the exchange rate pegged at a point below r_e in Fig. 5.1. There are at least three possibilities as to what the government pegged exchange rate might be, which can be seen in Fig. 5.1. It might be between r_e and r_c^0, or r_c^0 or below r_c^0, where r_c^0 is the rate at which the entire demand for capital outflow, the amount ab, is being met by drawing down foreign exchange reserves. As a simplifying starting point, let us assume the pegged rate to be r_c^0. The government is thus drawing down foreign exchange reserves to meet the excess demand in the market at that rate. Drawing down reserves can not continue indefinitely[4]. If the government decides not to run down its foreign exchange reserves any further and not to shift the curves either by using deflationary policies or a combination of export subsidies and import taxes, it has two choices open to it to correct the disequilibrium. It can devalue the currency enough to have the exchange rate r_e, or it can retain the pegged exchange rate and decide to have strict exchange control by declaring that all foreign exchange transactions must go through the

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4. If the government depletes its foreign exchange reserves continuously to meet the excess demand, there would exist the threat of devaluation, exchange control, trade taxes or changes in domestic fiscal-monetary policies. This may create such expectation, as to induce people to change their behaviour in various goods and capital markets, thus affecting the supply and demand schedules. We, however, assume away all these complications introduced by changes in expectations.

exchange control authorities. r_c^0 is the official pegged exchange rate under a situation of exchange control. The government is assumed to ban all capital outflows and distribute whatever foreign exchange supplies are available to demanders of foreign exchange for current account transactions at the pegged rate.

The unsatisfied demand for foreign exchange for capital outflow may seek out another source of supply. One obvious source is a black market for foreign exchange. In the absence of any risks in dealing in the black market, the demand for capital outflow now blocked by the exchange control (D^k in Fig. 5.1) is the potential demand for foreign exchange shifted to that market. Hence the stage is set on the demand side for a black market in foreign exchange.

ii) Supply Curve of Foreign Exchange in the Black Market

In Fig. 5.2, S_1 is reproduced from Fig. 5.1 and shows the total supply of foreign exchange as a function of the legal rate in the absence of any exchange control. In the presence of a black market for foreign exchange, foreign exchange supplies are distributed between the official and the black markets. There are now two exchange rates. One is the official pegged exchange rate r_c^0, and the other is the black market rate, which we shall denote by r^b. We shall continue this practise of using subscripts for denoting different situations for one kind of exchange rate, and using the superscript for indi-
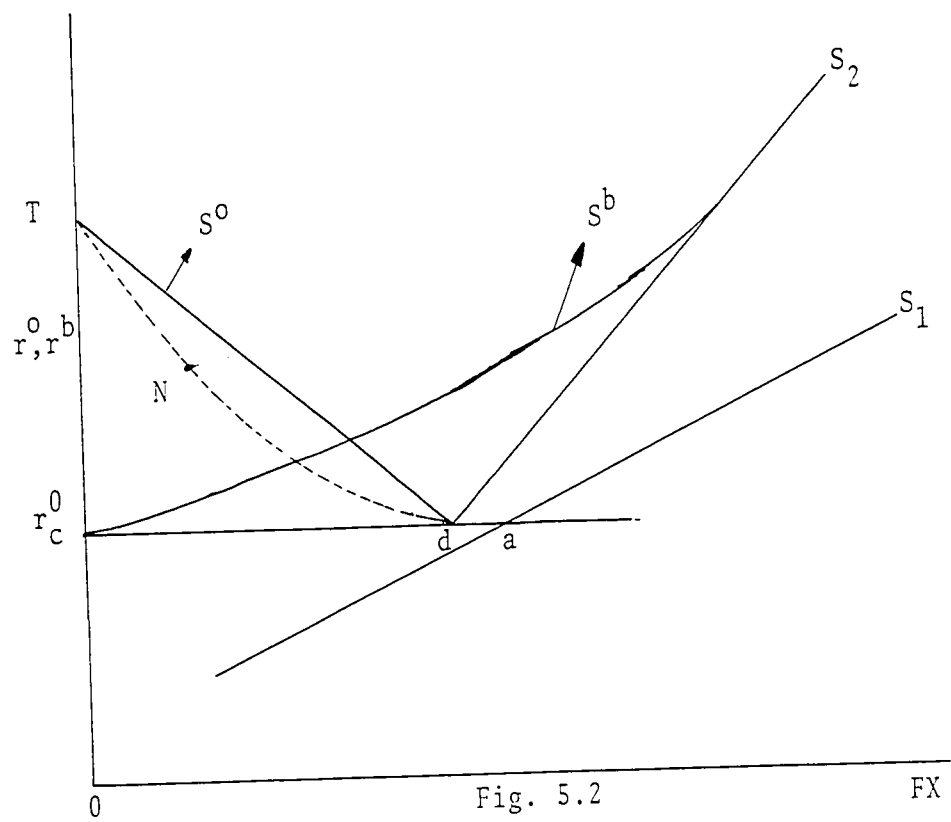
Fig. 5.2

cating the kind of exchange rate, i.e. official or black market.

S_2 is the supply curve of foreign exchange showing total supplies, official as well as to the black market, as a function of the black market rate r^b, given the official rate pegged at r_c^0. This curve is to the left of S_1, because with exchange control, capital inflow may be discouraged in the form of direct investment since it becomes uncertain to foreign investors whether or not they can take their profits or principals out of the country. (Thus even if the official exchange rate after the establishment of exchange control remains at r_c^0, the existence of exchange control may decrease total supplies of foreign exchange from a to d in Fig. 5.2 due to a decrease in capital inflow). Now given r_c^0, we have drawn S_2 everywhere steeper than S_1, meaning that an increase in the black market rate, when the official rate is pegged at r_c^0, will bring in lesser increases in the total supply of foreign exchange by increased exports of goods and services (as capital inflow is assumed to be independent of exchange rate changes) as compared to an increase in foreign exchange supply when the legal rate increases. This happens because of the risks involved in dealing in the black market. The exporters are assumed to add these risks as a further cost of supplying exportables and hence export less at a given black market rate as compared to the same legal rate; and with our assumption of elastic

foreign demand for the exportables of the country, the increase in foreign exchange earnings due to an increase in the black market rate are always shown to be less than a comparable increase if the legal rate had increased.

S^0 is the "availability"[5] curve showing the supplies of foreign exchange to the official market as a function of the black market rate. Given r_c^0 as the official exchange rate, we can have some knowledge of the shape of the S^0 curve from the behaviour of the exporters of goods and services and those supplying capital to this country. S^0 is negatively sloped because as the black market rate r^b rises, given the official rate r_c^0, exporters will be tempted to divert more and more of their foreign exchange earnings from official to the black market. The same will be true of those sending capital.

There is another source of supply of foreign exchange into the black market, and that is from domestic residents overinvoicing imports[6]. When the black market rate is higher than the official rate, incentives are created to overinvoice imports (see Chapter II). If the proportion of overinvoicing to the total use of foreign exchange in the official market is an increasing function of the black market exchange rate (given the official rate

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5. This term is taken from Michaely (1954) p. 630.
6. We are discussing it separately because it will be useful in the coming analysis of the implications of a tariff.

r_c^0) we get the broken TNd curve, tracing the official supplies of foreign exchange at various black market rates which are effective in satisfying demand for foreign exchange for current account transactions. TNd is so drawn to indicate that if the black market rate is the same as the official rate, i.e. r_c^0, the proportion of total official supplies overinvoiced is zero, but rises as the black market rate rises relative to the official rate. When the black market rate rises to T, overinvoicing is again zero, because officially distributed foreign exchange for imports is nil.

Thus at any black market rate, given the official rate pegged at r_c^0; supply of foreign exchange to the black market = total supply of foreign exchange at that rate (given by the curve S_2) - supply to the official market (given by the curve S^0) + supply to the black market from overinvoiced imports (given by S^0 - TNd curves). Thus in Fig. 5.2, we substract TNd from S_2 at every black market rate to get S^b, the black market supply curve of foreign exchange, which gives us the supply of foreign exchange in the black market as a function of the black market rate given the official rate pegged at r_c^0.

iii) The Demand Curve for Foreign Exchange in the Black Market

In Fig. 5.3, we derive the black market demand curve for foreign exchange. A part of this demand is already known arising from the latent demand for capital out-
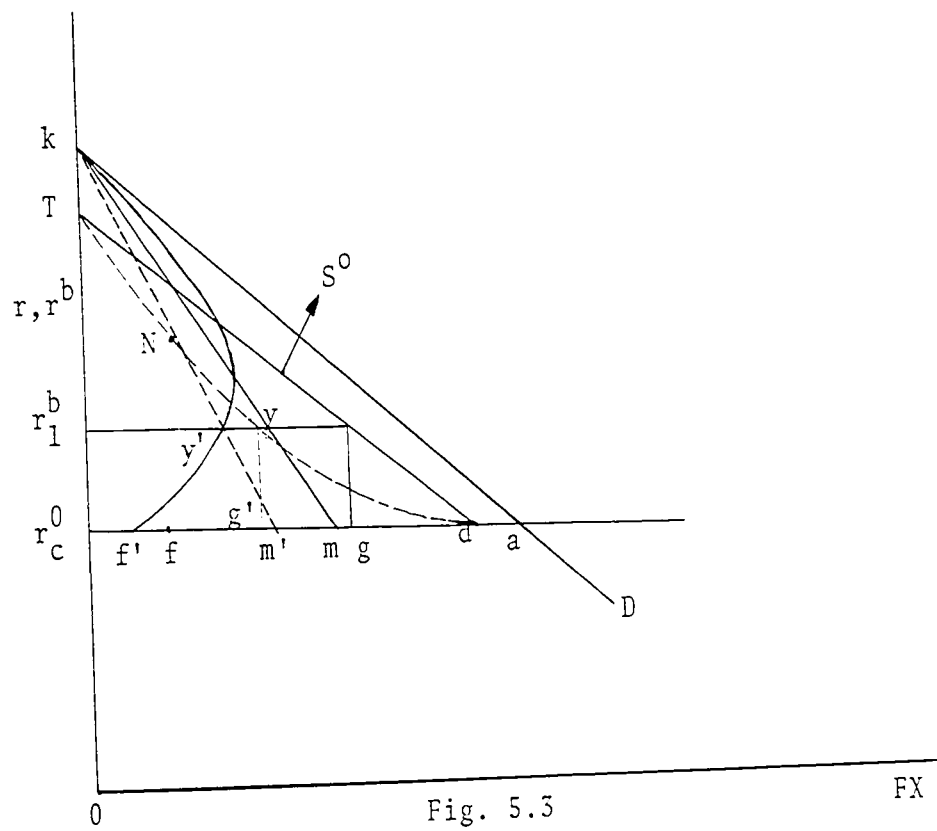
Fig. 5.3

flow.

Given the official rate r_c^0, from Fig. 5.1, we know the demand for foreign exchange for current account transactions. In the last section we saw that official supplies of foreign exchange depend upon the black market exchange rate given the official rate. This creates the possibility that the official supplies of foreign exchange may not be equal to the demand for foreign exchange from official authorities at the given official rate r_c^0 even if they were before the imposition of exchange control. Then with our assumption that government is not drawing down its foreign exchange reserves any further, any excess demand in the official market will be left unsatisfied and thus in the black market, there will be additional demand arising from restricted current account transactions. This demand for black market foreign exchange cannot thus be determined independently of the supply of foreign exchange into the official market.

In Fig. 5.3, we reproduce the curve D from Fig. 5.1 showing the demand for foreign exchange for current account transactions. S^0 and TNd have been reproduced from Fig. 5.2. Now given r_c^0 as the official pegged exchange rate, then at the same black market rate, the total supply of foreign exchange in the official market determined from S^0 curve is $r_c^0 d$, which is less than $r_c^0 a$, the amount demanded of foreign exchange from exchange control authorities. Then given the black market rate

$r^b = r_c^0$, the potential demand for foreign exchange in the black market for current account transactions is $r_c^0 f$ (which is equal to da), the demand left unsatisfied in the official market. If because of risks involved, not all unsatisfied demand turns up in the black market, and if the proportion which turns up is given by $\dfrac{r_c^0 f'}{r_c^0 f}$, then we get one point on our demand curve for foreign exchange in the black market for current account transactions as f', as only $r_c^0 f'$ of unsatisfied demand appears in the black market[7].

Now assume that the black market rate is given by r_1^b as compared to the official rate r_c^0. From our definition of the S^0 curve, we know that an amount $r_c^0 g$ of foreign exchange is supplied to the official market. However, because of a higher black market rate as compared to the official rate, gg' is received by demanders for overinvoicing of imports, thus leaving only $r_c^0 g'$ to satisfy

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7.   We are assuming that the existence of exchange control and rationing does not affect consumer behavior, and thus does not shift the D curve itself by changing consumers' utility functions. Furthermore, the substitution of the policy of using the foreign exchange reserves by exchange control to correct the balance of payments disequilibria and the existence of a black market may redistribute the purchasing power in the national economic system. This may affect the originally drawn supply and demand curves. We, however, retain our assumption that these curves do not shift.

the demand for foreign exchange for current account trans-
actions from the official market. The amount ag' is the
potential demand in the black market at a rate $r^b = r_c^0$.
This would decrease as a function of the black market
exchange rate. To determine the point on our black
market demand curve for the rate r_1^b we have to know the
demand at that black market rate. From the point r_c^0, we
make ag' = $r_c^0 m$.

How this unsatisfied demand $r_c^0 m$ (at the rate r_c^0)
decreases in the black market for higher black market
rates depends upon the behavior of those operating in the
black market. This in turn depends upon who are turned
away from the official market due to the limited supplies
of foreign exchange there. There are two factors which
determine this; the form of rationing of the limited
amounts of foreign exchange in the official market, and
the possibility of resale of the foreign exchange acquired
from the exchange control authorities. To keep our
analysis simple and to follow Michaely's analysis, we
assume for the present that there is no resale of foreign
exchange. This assumption is relaxed in Part V of this
chapter and its implications considered there. As for
the form of rationing, the simplest assumption to make is
that there is a neutral distribution of the limited
amount of foreign exchange between various applicants, the

same assumption used by Bronfenbrenner[8]. By this we mean
that the distribution is such that the response of those
left unsatisfied in the official market to the black
market rate is a proper fraction of the demand curve D at
every black market price of foreign exchange. The locus
of such points is the curve km[9]. In the absence of any
risks, the demand for foreign exchange in the black market
at the black market rate r_1^b will then be $r_1^b y$ in Fig. 5.3.

In the presence of risks, and if risk in operat-
ing in the black market is not a function of the exchange
rate, the demand for foreign exchange appearing in the
black market at the exchange rate r_1^b in the black market,
will be a fraction of $r_1^b y$, the fraction being given by

$\dfrac{r_c^0 f'}{r_c^0 f}$, as discussed before, so that at the black market rate

r_1^b, the black market demand for foreign exchange is

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8. We are not using Michaely's solution to this
rationing problem that everyone demanding the rationed
commodity gets the same amount and the number of buyers is
proportional to the 'inhibited quantity' demanded, because
this leads to the rationing authorities accumulating the
scarce commodity and furthermore, the ratio of the supplies
retained by the authorities to the total supplied to them
increases as the total supplies to the authorities decrease,
which at best is a very unrealistic assumption.
Michaely, pp. 630-31.
9. At every price of foreign exchange, this neutrality
assumption means, that the elasticity of demand on this
curve km will be the same as the corresponding elasticity
on D curve, given our other assumptions (like no resale).
See Bronfenbrenner (1947) for a discussion on this point,
pp. 112.

$$r_1^b y' \text{ (i.e. } \frac{r_1^b y'}{r_1^b y} = \frac{r_c^0 f'}{r_c^0 f} \text{).}$$

Joining all points like f', y' and k, derived in the same way, we get the black market demand curve ky'f' for current account transactions. This curve is positively sloped in a range[10] because, an increase in the black market rate has two effects. First, it decreases the official supplies of foreign exchange, thus diverting greater unsatisfied demand to the black market; and second, the higher black market rate directly decreases demand for foreign exchange. As long as the first effect is stronger than the second, an increase in the black market rate will, by increasing the black market demand, make the demand curve positively sloped.

To get the demand curve for foreign exchange in the black market, showing total amounts of foreign exchange demanded as a function of the black market exchange rate, we need to add the demand for foreign exchange in the black market for capital outflow. We know from Fig. 5.1, that D^k represents the potential demand for foreign exchange for capital outflow in the black market. How much of this demand appears in the black market again depends upon the risks attached to dealings in the black

10.   This was first shown by Michaely (1954) pp. 630-31.

market for capital outflow. Again assuming that risk is not a function of the black market exchange rate, suppose the fraction of this demand which appears in the black market is given by D_1^k in Fig. 5.4. D_1^k has unitary elasticity at every point, as capital outflow in local currency is again assumed to be independent of the exchange rate.

Thus the total demand curve for foreign exchange is derived in Fig. 5.4 by adding the demand curves ky'f' in Fig. 5.3 and D_1^k in Fig. 5.4 and is labelled as D^b in Fig. 5.4. We also reproduce the black market supply curve for foreign exchange S^b from Fig. 5.2.

Equilibrium in the black market occurs at E^b, and the equilibrium black market rate is r_e^b.

iv) Stability of Equilibrium in the Black Market:

The positive slope of D^b in a range raises the question whether or not the equilibrium in the black market represented by E^b in Fig. 5.4 is stable. It can be easily shown that it is.

Equilibrium E^b would be stable provided D^b cuts S^b from below, which it does in Fig. 5.4. The reason is that if the black market rate is r_c^0, the supply of foreign exchange in the black market is zero (see Section ii) and there is some positive demand for it in that market (see Section iii). Because of this, D^b starts to the right of S^b and if it cuts S^b, it must cut it from below, thus giving a stable equilibrium in the black market.
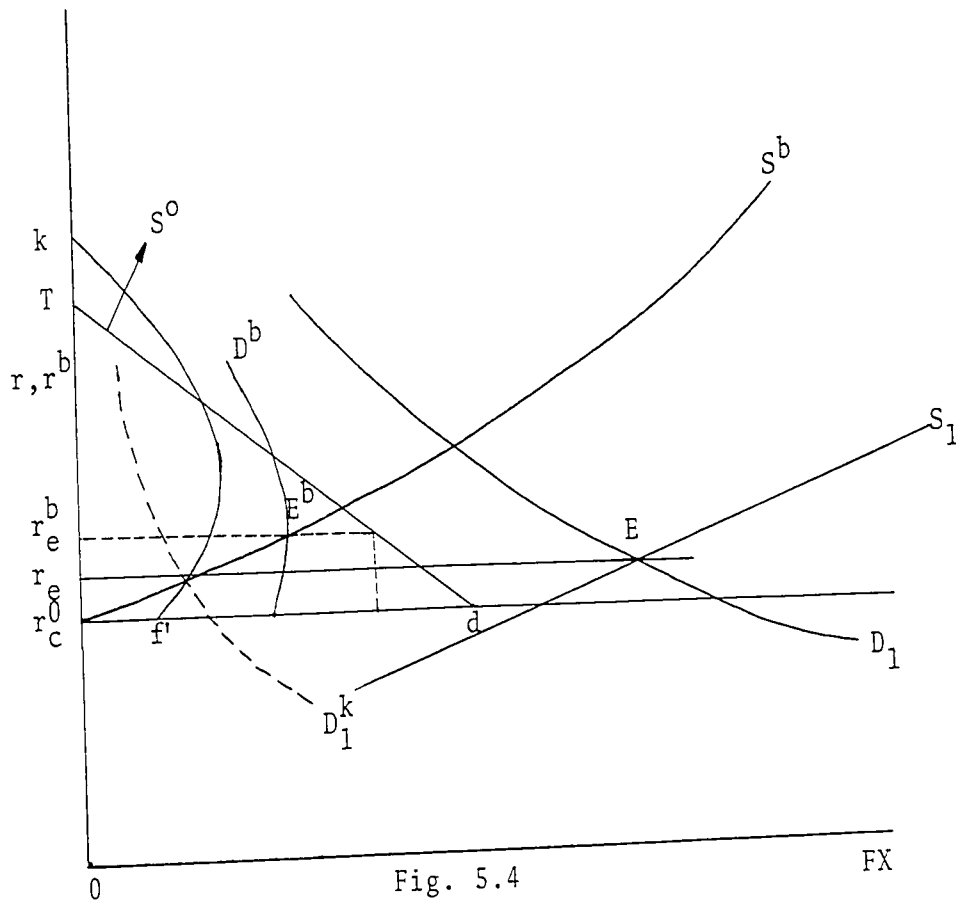
Fig. 5.4

But would D^b always intersect S^b? This is a question of the existence of any equilibrium like E^b. The answer is that it must.

D^b must intersect S^b if D^b is negatively sloped, or even if it is positively sloped, its slope is greater than that of S^b. Suppose the black market rate rises from r_c^0. This brings in new supply of foreign exchange into the black market from 1) increased exports as the exporters get a better price; and 2) increased diversion from the official market.

Now because of (2), there is an increase in the unsatisfied demand in the official market which turns to the black market. D^b may be positively sloped if this appearance of new demand in the black market more than offsets the negative effect on demand there because of a higher black market rate (otherwise it will be negatively sloped). But it is clear that an increase in demand in the black market (if there is any) due to an increase in black market rate is only a fraction of diverted supply of foreign exchange from official market as indicated in (2), whereas new supply in the black market is the sum of (1) and (2). Hence D^b must always be more steeply sloped than S^b, and thus there exists an equilibrium in the black market.

II Comparison of r_e^b, the Equilibrium Exchange Rate in the

Black Market and r_e, the Equilibrium Rate in the Absence

of Controls.

Fig. 5.4 is drawn so that the equilibrium black

market rate r_e^b is higher than the equilibrium exchange

rate in the absence of controls, r_e. In the present sec-

tion we see the conditions under which it is true.

Suppose there are no legal or moral risks in-

volved in dealings in the black market. Obviously then,

the black market will completely replace the official mar-

ket, because all suppliers of foreign exchange would divert

all their supplies of foreign exchange to the black market

at any black market rate higher than the official pegged

rate r_c^0 in Fig. 5.4. Hence above r_c^0, the black market

supply curve will be the same as S_1. All demand for

foreign exchange above r_c^0 would have to move to the black

market to be satisfied there. Hence the black market

would operate like a free market, and the equilibrium ex-

change rate in the black market would thus be r_e, the equi-

librium exchange rate in the absence of any controls.

$r_e E$ will be supplied and demanded in the black market.

Operations in the black market are, however, not

a riskless affair and both official and black markets

exist side by side.

Let us begin with the assumption that $r_e^b = r_e$,

and then see if in the presence of exchange control and a

black market, the rate $r_e^b = r_e$ can be sustained in the

black market or not. If it can not be, then the equi-
librium exchange rate in the black market will be different
from the equilibrium rate in the absence of controls. We
simply have to see whether or not the total quantities
demanded of foreign exchange are equal to the total
quantities supplied at this black market rate, r_e. If
they are not, then the black market rate will not be r_e in
equilibrium[11].

a) Supplies: In Fig. 5.5, all the curves are the same as
defined earlier.

In the absence of any risks to suppliers of
foreign exchange in operating in the black market, given
the official rate r_c^0, and black market rate r_e, total
supplies of foreign exchange are as given by the curve S_1.
Hence at the rate r_e,

$$(1) \quad \text{riskless total supply} = r_e E$$

With risks, given the official rate r_c^0, and
black market rate r_e, the total supply of foreign exchange
is as given by the curve S_2. Then at the rate r_e,

$$(2) \quad \text{with risk total supply} = r_e J$$

b) Demand: We use Fig. 5.6 to calculate total demand for
foreign exchange. The curves S_1, D_1, D and TNd are the
same as defined earlier.

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11.   Only a knowledge of total quantities demanded and
supplied is sufficient to show whether r_e can be sustained
as the equilibrium rate in the black market because, to
bring equilibrium only r^b can adjust, as the official rate,
by definition is pegged.
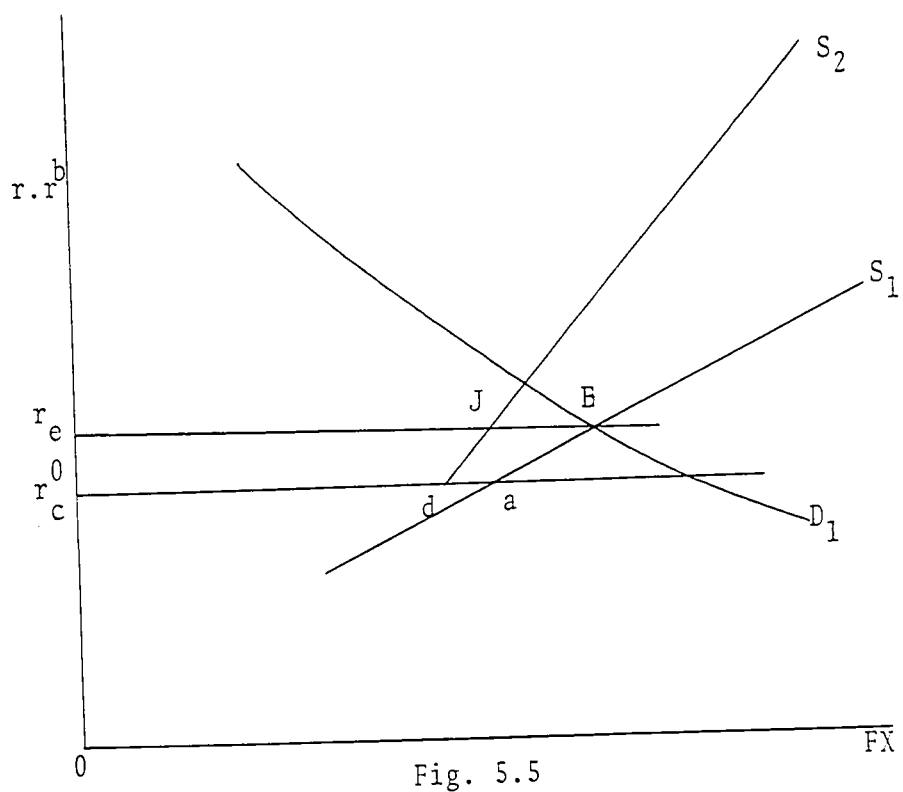
Fig. 5.5

In the absence of risks for those desiring a capital outflow, using the black market, at the rate r_e in the black market

(3) riskless demand for

capital outflow = XE

This demand is equal to XE in Fig. 5.6, because by definition, the difference between total foreign exchange demand curve, D_1, and demand curve showing current account demand D, at the rate r_e, is the demand for foreign exchange for capital outflow.

In the absence of risks; for those demanding foreign exchange in the black market for current account transactions, given the official rate r_c^0, at a black market rate r_e, total demand for foreign exchange is

(4) $r_e L + Lq = r_e q$

The reason for this is as follows. Given the official rate r_c^0, the current account demand for foreign exchange from exchange control authorities is given by $r_c^0 a$. Now given the black market rate r_e, only $r_e L = r_c^0 n$ is effective in satisfying a part of this demand, as given by the curve TNd, and argued earlier. The quantity na is the unsatisfied demand from the official market which turns towards the black market. This demand would decrease in the black market if the black market rate is higher than r_c^0. Given our assumption of neutrality in rationing of foreign exchange by official authorities and no possibility of

resale, this demand na decreases as a function of the black market exchange rate along the curve ah, where we have drawn ah in the same way as km in Fig. 5.3, except that whereas we have drawn the triangle r_c^0km taking r_c^0 as the origin, the origin for triangle nah is now n. Then at the black market rate r_e, Lq of the demand appears in the black market. Hence the total demand for foreign exchange at black market rate r_e, given official rate pegged at r_c^0, is r_eL + Lq.

Given that the curve ah is a proper fraction of D (our definition of neutrality of rationing), and hence hn = kr_c^0, as long as an < r_c^0 a (i.e. a part of demand for foreign exchange is being satisfied in the official market), point q on the curve ah must always be to the right of point X on the curve D[12]. Thus, for the assumed black market rate $r^b = r_e$ and official rate r_c^0 pegged at a lower level than r_e, the amount of foreign exchange demanded for current account transactions, r_eq, is greater than the demand, r_eX, if the rate r_e had prevailed in the market. The intuitive explanation is that with the official rate pegged at a lower level, some people who would not have used foreign exchange at the rate r_e are using it at the rate r_c^0, hence tending to increase total demand.

(5) From our above discussion we thus find that

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12. This follows directly from the implications of our neutrality assumption.
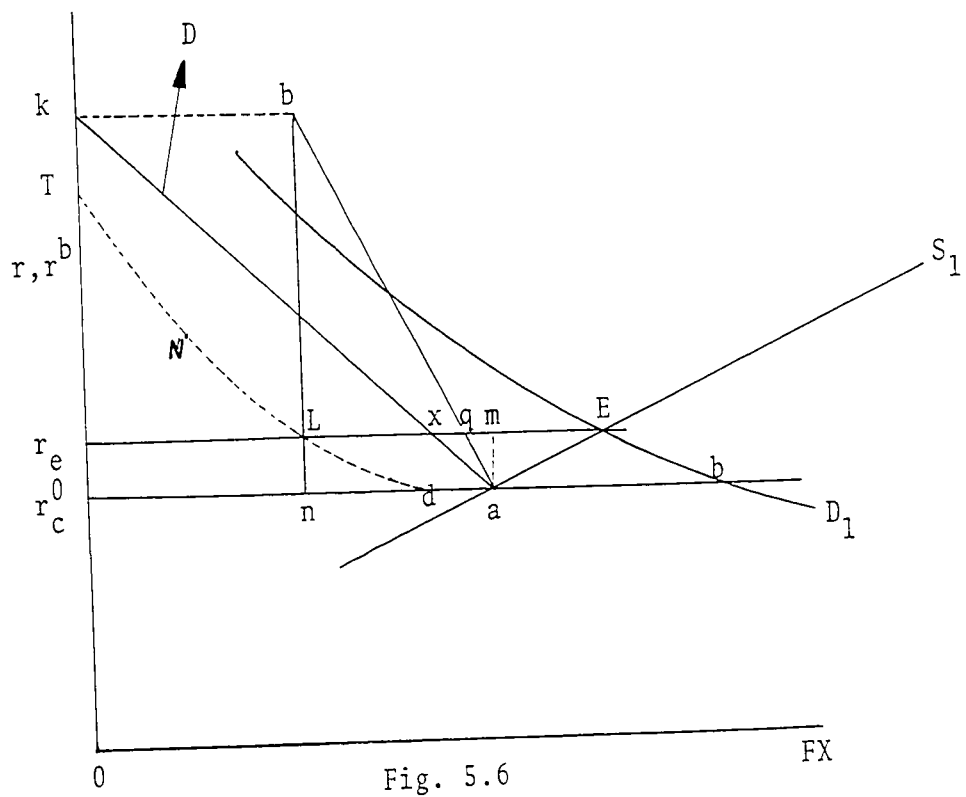
Fig. 5.6

(5) $$r_e q > r_e X$$

(6) And the total foreign exchange demand for foreign exchange is the sum $= r_e q + XE$ of (3) and (4) and is

(7) But we know that

$$r_e X + XE$$
$$= r_e E$$

and thus from (5) - (7) we can conclude that

(demand) $r_e q + XE > r_e E$ (supply)

c) Equilibrium: Comparison of (1) and (7) shows that at the assumed rate $r^b = r_e$, if only suppliers do not face risks, they supply an amount $r_e E$, and if only demanders do not face risks then demands are greater than $r_e E$. If because of risks, only a fraction of both these quantities supplied and demanded appear in the market, (the fraction being the same both for supply and demand, such as, $\dfrac{r_e J}{r_e E}$ as indicated in (2)) it is obvious that at the black market rate $r^b = r_e$, there will be excess demand for foreign exchange. Thus the black market rate in equilibrium, r_e^b, must be higher than the equilibrium rate in the absence of controls, r_e.

This result is based on the assumption that the fraction of decrease in quantity demanded due to risks in dealings in the black market is the same as that of a decrease in the supply of foreign exchange. If, however, the demand for foreign exchange decreases by a greater proportion, it is possible that the black market exchange

rate in equilibrium may be lower than the equilibrium rate in the absence of controls. (It may still be higher than or equal to the equilibrium rate.) This possibility can arise if capital outflows decrease much more than other items due to risks. This may happen either because the government is severe on those trying to transfer out capital or, if the capital outflow consisted mainly of direct investment abroad. The investors might find operation through the black market too risky for the conversion of their principal and profits.

III Exchange Control and the Current Account Use of Foreign Exchange

We now want to consider the effect of exchange control on total current account use of foreign exchange (allowing for the existence of a black market) as compared to the situations:

(1) where the government makes the alternative choice of devaluation to the equilibrium exchange rate and abandons exchange control;

(2) where the government draws down foreign exchange reserves in the absence of exchange control.

1. Devaluation: At the equilibrium exchange rate in the absence of controls r_e, we can see from Fig. 5.6, that the foriegn exchange used for current account transactions is $r_e X$. At a black market $r^b = r_e$ (with a pegged official rate r_c^0), foreign exchange demand in the absence of risks will be $r_e q > r_e X$, as seen above. However, this demand

$r_e q$ is not the demand actually being satisfied. This is because of risks in the black market, which eliminates some of the demand, and due to the fact that r_e may not be the equilibrium rate in the black market. If the black market rate is higher than r_e (which, as we saw above, will be the case if the proportionate decrease in demand and supply of foreign exchange due to risks is the same) this will further tend to decrease the demand. Then with equilibrium in the black market, it is not certain whether the actual demand for current account transactions being satisfied with controls is greater than $r_e X$. Hence the effect of exchange control on current account use of foreign exchange is uncertain as compared to the adoption of the equilibrium exchange rate r_e without controls.

Capital outflow in the absence of exchange control and at the exchange rate r_e would be equal to XE in Fig. 5.6. With exchange control and risks in dealing in the black market, capital outflow at the black market rate r_e will be less than XE, and if the equilibrium black market rate is higher than r_e (which it would be under the condition mentioned above), there is a further depressing influence on capital outflow. Hence, exchange control successfully reduces the total capital outflow (leaving aside speculative capital outflow created by exchange control).

2. Reserve Loss: If r_c^0 is the pegged official rate (Fig. 5.6), and if the government is drawing down

reserves, $r_c^0 a$ is the amount of foreign exchange used for current account transactions. Exchange control by creating a black market diverts official supplies to the black market and the official supplies are less than $r_c^0 a$. As the unsatisfied demand at that rate in the official market is not all satisfied in the black market due to risks and a black market rate higher than r_c^0, the amount of foreign exchange used for current account transactions both from official and extra legal sources decreases.

As capital outflows are banned, risk in operating in the black market and a black market rate higher than r_c^0 tend to decrease the capital outflow with the adoption of exchange control.

IV An Import Tariff

In this section we want to see how the imposition of an across-the-board import tariff in the framework developed above effects (a) the black market exchange rate (b) the supplies to the official market, and (c) the current account use of foreign exchange. Our procedure here will be to find out the effect on the black market exchange rate by assuming that even in the presence of a tariff, the black market rate stays the same and then try to see, whether at that black market rate, excess supply or demand for foreign exchange is created by the imposition of the tariff.

In Fig. 5.7, before the imposition of the tariff, suppose the black market demand and supply curves are such
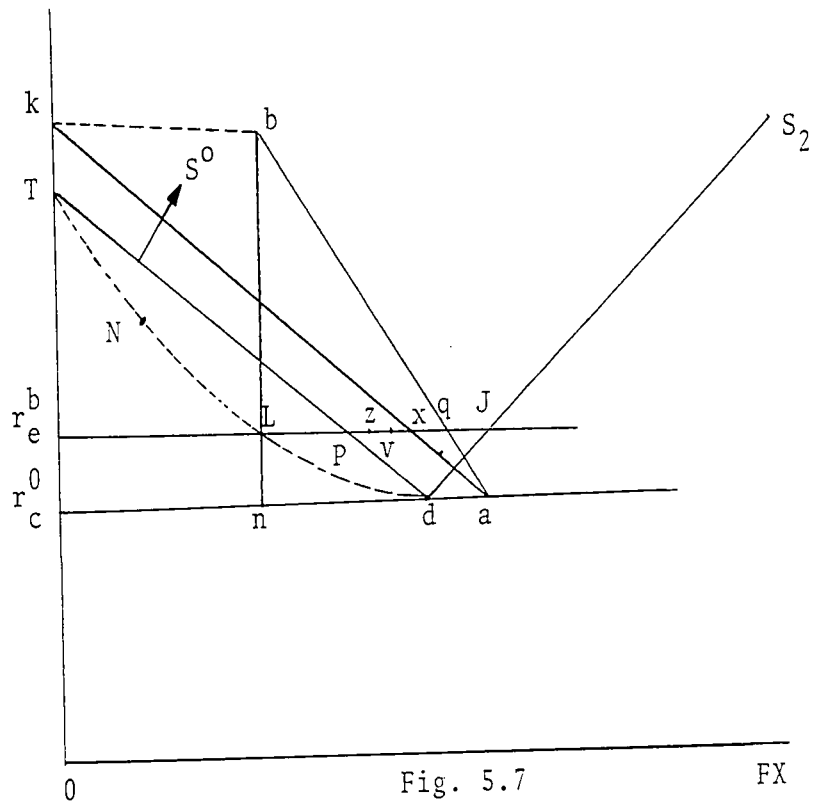
Fig. 5.7

as to give the black market rate r_e^b in equilibrium. (To keep the diagram simple, we do not draw these curves.) The amount na is the current account unsatisfied demand from the official market (the official supplies effective in satisfying demand for foreign exchange from the official market are $r_e^b L$ as given by the curve TNd, out of a total current account demand of $r_c^0 a$ at the pegged official rate r_c^0). Using the same procedure as developed before, in the absence of risks, out of na, the demand which appears in the black market at the rate r_e^b is Lq, and if risks decrease this demand by the proportion $\frac{Vq}{Lq}$, the quantity demanded for foreign exchange for current account transactions is Lv in the black market. The rest of the demand, VJ, is the quantity of foreign exchange demanded in the black market for capital outflow.

Suppose now a tariff at the <u>ad valorem</u> rate equal to the difference between r_e^b and r_c^0 is imposed so that the <u>ad valorem</u> rate of tariff $t = \dfrac{r_e^b - r_c^0}{r_c^0}$. (This is assumed for keeping our diagram simple by not adding other lines and curves).

The tariff enters as a different method of rationing limited amounts of foreign exchange. Then at the effective official rate of r_e^b, the quantity of foreign exchange demanded from the official market decreases from $r_c^0 a$ to $r_e^b X$.

Furthermore, this tariff rate completely eli-

minates the difference between the black market rate and the tariff inclusive implicit official rate, and hence eliminates incentives for overinvoicing imports. Then an additional amount LP in Fig. 5.7 is used to effectively satisfy the foreign exchange demand from the official market for current account transactions. Only the amount PX is the potential demand in the black market, and if the same proportion $\frac{Lv}{Lq}$ appears in the black market, the quantity demanded of foreign exchange for current account transactions in the black market will be Pz. Hence the total demand for foreign exchange with the imposition of a tariff is $r_e^b z$ as against $r_e^b v$ in its absence.

Now it is in general not possible to say whether z would be to the left of v (meaning tariff decreases total demand for current account transactions) or to the right of it (i.e. total demand increases because of tariff). Let us take two extreme cases.

Assume that there are no risks in the black market, hence whatever the potential demand, it appears in the black market. Then v coincides with q, and z with X. Hence X is to the left of q, and the tariff decreases total demand.

If there are infinite risks in dealing in the black market for demanders, none of the unsatisfied demand appears in the black market. Then in the absence of a tariff, potential demand Lq for the black market disappears, and hence v coincides with L, showing no black

market demand.   With the tariff, z coincides with P,
and P is to the right of L; thus the tariff increases total
foreign exchange demand.

An intuitive explanation can be given to support
this result.   An import tariff creates two opposing
effects on total demand for foreign exchange.   A tariff
eliminates the demand of those using foreign exchange at a
lower price thus tending to decrease total foreign ex-
change demand.   On the other hand the tariff, by further
eliminating overinvoicing of imports, allows greater
demand for foreign exchange for current account trans-
actions to be satisfied in the official market.   As there
are no risks in dealing in the official market, some new
demand appears in the official market which was depressed
before due to black market risks.   Due to these opposing
tendencies, the net effect on total foreign exchange de-
mand is uncertain.

We can thus conclude that the effect of a tariff
on black market rate is indeterminate, which further means
that as the new differential between r_e^b and r_c^0 is unknown,
the effect of tariff on total official supplies of foreign
exchange (which is a function of $r_e^b - r_c^0$) and the total
current account use of foreign exchange is uncertain.

V Resale of Foreign Exchange

So far we have derived our results using the
simplifying assumption that resale of foreign exchange is
not practised.   In the real world there are cases in

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which resale is not prohibited by the authorities, and even if it is, it may still be going on illegally. In the present section our interest is to see, how crucially the results we have derived so far depend upon this assumption. As it turns out, relaxing this assumption, and in its place introducing the other extreme assumption that there is a perfectly functioning resale market for foreign exchange, we find that some of our results change fundamentally.

a) Comparison of r_e^b, the Equilibrium Exchange Rate in the Black Market and r_e, the Equilibrium Rate in the Absence of Controls.

We return to Fig. 5.6 to consider the relationship between the equilibrium rate in the black market (r_e^b) with exchange controls, and the equilibrium rate r_e without any exchange control. We use the same technique again, namely, assuming that the black market equilibrium rate is the same as r_e and then finding out if that rate could be sustained or not.

With the possibility of resale of foreign exchange, those who were using some foreign exchange at the lower rate r_c^0 will find that the opportunity cost of using foreign exchange is r_e, so that resale offers them pure profits. With a perfectly functioning resale market, everyone considers r_e as the opportunity cost of using foreign exchange. In the absence of any risks for demanders, total demand for foreign exchange at this rate is $r_e E$; and the supply also is $r_e E$ in the absence of any

risks.   If risks in operating in the black market de-
crease this demand and supply by the same proportion, it
is obvious that there will be no excess demand at the
black market rate r_e, hence it will stay as the equili-
brium rate in the black market; thus $r_e = r_e^b$, in contrast
with the conclusion in Part II that $r_e < r_e^b$.

b) Exchange Control and the Current Account Use of
Foreign Exchange.

We again see the effect of exchange control on
total current account use of foreign exchange as compared
to the situation

1) where the government makes the alternative choice of
devaluation to the equilibrium rate abandoning exchange
control.

2) where the government draws down foreign exchange
reserves before the imposition of exchange control.

1. Devaluation: Total current account use of foreign
exchange is equal to the total foreign exchange used minus
capital outflows. With equal proportionate decreases in
the supply and demand of foreign exchange due to opera-
tions in the black market $r_e^b = r_e$, as just shown, and total
current account use of foreign exchange definitely de-
creases.

With reference to Fig. 5.6, we see that capital
outflow at the rate r_e in the absence of risk is XE, which
is only a fraction of total supply of foreign exchange
r_eE.   If due to risk, both decrease by the same proportion,

there will be a greater absolute decrease in the supply of foreign exchange, thus making current account expenditures smaller. This result is again different from the one derived in Part III where we found the effect on current account expenditures to be uncertain.

2. Reserve Loss: If r_c^0 is the pegged rate, then in the absence of controls, $r_c^0 a$ is the quantity utilized of foreign exchange for current account transactions. With controls, again only a part is supplied from the official market, and the rest demanded at the higher black market rate, thus tending to decrease these expenditures. Again from this point of comparison, exchange control decreases current account use of foreign exchange.

In both cases it is obvious that capital out-flows decrease with exchange controls.

c) An Import Tariff.

We now briefly look into some of the results already derived in Part IV after relaxing the assumption of no resale of foreign exchange.

To reconsider the effect of a tariff on the black market rate we return to Fig. 5.7. In the absence of any tariff, with a black market rate r_e^b, total demand for current account transactions is $r_e^b X$ in the absence of any risks. This is because, with a perfectly functioning resale market, everyone considers r_e^b the opportunity cost of using foreign exchange. The quantity $r_e^b L$ is satisfied in the official market as shown by the curve TNd. The

quantity LX turns to black market, and let us assume, only

a proportion $\frac{Lz}{LX}$ of that appears there due to risks.

A tariff of the magnitude $\frac{r_e^b - r_e}{re}$ would not in

the present situation lead to any decrease in the total

demand for foreign exchange (keeping r_e^b constant for the

time being to find if any excess demand is created at this

rate or not), because the users of foreign exchange al-

ready consider r_e^b as the rate showing the opportunity cost

of using foreign exchange. The tariff only mops up the

profits of those getting foreign exchange at a lower

rate r_c^0.

A tariff, however, leads to an elimination of

overinvoicing of imports, and thus leads to an additional

amount LP of foreign exchange satisfying demand from

official market. Now only PX of the unsatisfied demand

turns towards black market. As PX is less than LX, then

the decrease in demand due to risks (if the proportionate

decrease is the same, $\frac{zX}{LX}$) would be less than Xz and let us

say it is equal to XV, where V is to the right of z.

In the absence of a tariff, the total demand for

current account transactions is $r_e^b z \, [r_e^b L + Lz]$ and now

with tariff, it is $r_e^b V \, [r_e^b P + P_V]$; the quantity demanded

at the rate r_e^b will increase. This means that a tariff

will increase the black market rate[13]. This is again

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13. In the standard no-black-market, no exchange control
situation, and with a flexible exchange rate, a tariff de-
creases the demand for foreign exchange and thus would

different from the result we derived earlier in Part IV.

The effect of a tariff on the total official foreign exchange supplies can also be seen from Fig. 5.7. Because a tariff increases r_e^b, the increased gap between r_e^b and r_c^0, shows, from the curve S^0, that total official supplies of foreign exchange would decrease.

An increase in r_e^b would decrease capital outflow and increase foreign exchange supplies as shown by S_2. Hence the difference between the two, the current account use of foreign exchange, will increase due to an import tariff.

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depreciate the exchange rate (as defined in the text). In our problem, given the set of assumptions, we find that the tariff does not decrease the demand for foreign exchange, that official rate is pegged and that overinvoicing of imports is eliminated. Because of this last factor, a tariff actually increases total demand for foreign exchange because there is a smaller absolute amount eliminated by the risk of dealing in the black market. To eliminate this excess demand, the black market rate must appreciate.

CHAPTER VI

UNDERINVOICING OF IMPORTS IN PAKISTAN

This chapter examines the issue of underinvoicing
of imports in Pakistan.   In Part I, we briefly describe
the system of import controls as practised in Pakistan.
In Part II we discuss the technique used to establish the
existence of underinvoicing of imports and analyse some of
the theoretical and empirical problems associated with
using this technique.   Finally, in Part III, we study
Pakistan's case for the period 1965-68 and try to deter-
mine whether or not there was a relationship between under-
invoicing of imports and the import control policies
followed by the government during that period.

I. Systen of Import Control in Pakistan 1965-68.

Like many developing countries, Pakistan faced
balance of payments problems during 1965-68 and the solu-
tion used to cope with them was recourse to strict exchange
controls and import licensing.   During the period, the
Pakistani currency, Rupee, was overvalued at the official
exchange rate pegged at Rs. 4.75 (abbreviated for Rupees)
per U.S. dollar.   Under the exchange control regulations,
all foreign exchange earned by the exporters was to be
sold to the foreign exchange controlling authority, the
State Bank of Pakistan.   Import of all goods was one way
or the other controlled by the government, and goods could

only be imported (legally) by purchasing a foreign exchange cover from the State Bank of Pakistan.

The goods which were allowed to be imported were listed in the Import Policy announced by the Chief Controller of Imports and Exports. This important document occupied a central position in the broader strategy of economic planning. During the period 1965-68, this policy was announced annually or bi-annually.

In 1965, the Import Policy was announced twice, in January and July. Permissable imports were divided into three lists, each with different sets of rules. First was the 'Free List'. The main features of the Free List were:

1) Items on this list could be imported without any one having to secure a license from the Chief Controller of Imports and Exports (CCI&E).

2) These items could be imported freely at the official exchange rate, which as already mentioned, was overvalued during that period.

3) Free List items had some restrictions on the minimum and maximum size of orders. The restrictions were not placed to limit their supply, but as Stern[1] argues, "The restriction on a minimum size purchase order was an effort to obtain some of the benefits of bulk purchasing and the effort to restrict maximum size was intended to prevent

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1.   Stern (1970) p. 84 footnote 17.

domination of trade by few importers".

4) The free list included items which were either raw materials for some domestic industries like iron and steel, and chemicals, or essential goods like technical and scientific books or drugs and medicines.

Secondly, there was the 'Open General License List' (OGL). Its main features were:

1) Items on this list could be imported only by obtaining a license from the CCI&E.

2) Anybody could apply and get a licence, except for six commodities (of which agricultural machinery and tyres and tubes are included in our discussion of Section III). For these six items, only the established importers, i.e. those who had imported the goods over the previous years, could be granted licenses.

3) Imports were allowed at the official exchange rate.

4) Licenses were initially issued for the items on this list specifying the minimum and maximum limit of import indicated against each item. However, extra licenses called Repeat Licenses could be obtained from the CCI&E, if anyone wanted to import extra quantities of any item on the list, provided that the value of the additional quantities to be imported was not less than 75% of the value of the previous license issued for the import of that item.

5) This list consisted of some other intermediate goods like tool and workshop equipment, agricultural machinery

and typewriters, etc., and 'essential' consumer goods.

The third list was entitled, 'Items Other than those on Free List/OGL', and listed other permissible imports. Its special features were:

1) A license was to be secured from the CCI&E for importing any item on this list.

2) The basis of licensing was determined by Regional Controllers separately for each item. Everyone could not get an import license as in the case of OGL. Only established importers or those allowed as newcomers could apply to get a license (but did not automatically get it, as the decision rested with the Regional Controllers). Newcomers were invited only for the import of three items (none of which is included in our analysis of Section III).

3) Items on this list could also be imported for personal use provided that they were imported under the Export Bonus Scheme, for which the importer had to purchase foreign exchange at the implicit exchange rate of approximately Rs 12/$ (compared to the official rate of Rs 4.75/$, details below). Other allowed imports under this list could come at the official exchange rate.

4) Except for the raw material and intermediate goods requirements of some industries, no repeat licenses, as defined above, could be obtained.

The Export Bonus Scheme was another feature of the Import Policies. A list of goods was periodically issued separately by the Ministry of Commerce which could

be imported under the Export Bonus Scheme (in addition to the permission to import some goods for personal use under this system as mentioned previously). "Exporters whose commodities were covered by the scheme received a voucher equal to a certain proportion of the value of their exports, the proportion being determined by the government, and was different for different commodities. This voucher which could be freely sold, entitled the holder to purchase an equivalent amount of foreign exchange to be used for the import of any items on the Bonus List. [In that period], given the scarcity of foreign exchange, such vouchers usually sold at a premium of 150 to 180 per cent of their face value. The implicit exchange rate facing the importer under bonus vouchers was approximately Rs 12/$[2]".[3]

"With the exception of a few items, import of only such items [was] permissable under Export Bonus Scheme as [was] not covered by Free List or not importable under normal licensing"[4]. Due to the separation of func-

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2.   If, for example, an exporter held a voucher worth $1, he could sell it in the market for Rs 7.13 if the premium on foreign exchange was 150% and the official rate Rs 4.75/$ [Rs 4.75 + .5(4.75) = Rs 7.13]. An importer who purchased this voucher was entitled to purchase foreign exchange at the official rate by submitting the voucher to the State Bank of Pakistan. Thus he would buy $1 from the State Bank by handing in this voucher and Rs 4.75. Then the cost of purchasing a dollar to the importer would have been Rs 11.88 (7.13 + 4.75).
3.   Stern (1970) p. 22.
4.   Gazette of Pakistan, Extraordinary, (1964), p. 283.

tions of issuing the Bonus List from the issuing of the Import Policy, there was sometimes an overlapping of the goods on the Bonus List and goods importable under other types of licenses[5].

The above analysis suggests that items placed on the Free and OGL Lists could be imported freely as compared to the items not on these lists. There were either relatively greater quantitative restrictions on their supply (the case of 'Items Other than those on the Free List/OGL', for which repeat licenses were not issued[6], and everyone was not eligible for imports), or their import was allowed only at a much higher implicit rate of exchange (items imported under Export Bonus Scheme). Thus both from the point of view of price restrictions and quantity restrictions, the supply of items not on Free List/OGL was restricted. This policy was in line with the government's objective of rationing scarce amounts of foreign

5.   Lewis (1970) p. 29.
6.   One reason given above for calling the third list 'Items Other than those on the Free List/OGL' restrictive as compared to the Free and OGL lists is the non-availability of the facility of repeat licensing, because to us this seems to be a tool used for restricting supply of the items on this list. However, there remains the problem that imports allowed of some items on this list under initial licenses may be enough to satisfy the demand for these goods (given world prices and official exchange rate), so that the supply of these goods is not restrictive. This calls for an estimation of the excess demand for import of various goods on the list and compare it with the figures of actual imports allowed in through licensing. We are not making any attempt to do this in this present preliminary study and will adopt the definition of restrictiveness used in the text.

exchange available in favour of essential consumer goods, raw materials and intermediate goods.

For the first six months of 1966, the July 1965 Policy remained operative. The July 1966 Policy eliminated OGL, merging it partly with the Free List and partly with the list entitled 'List of Items other than those on the Free List'. Other characteristics of the previous policies remained unchanged.[7]

In July 1967, a new list called Licensable List was added, having essentially the same features as that of the previous OGL. Licenses were issued both to the 'commercial importers' (ones allowed to resell the commodity) and 'industrial importers' (allowed imports for one's own use) depending upon the nature of the commodity. All commodities on this list were allowed import at the official exchange rate.

There was, however, a more fundamental change in the July 1967 Policy. The list entitled 'List of Items other than those on the Free List' was eliminated, and was replaced by a new system of imports under the 'Cash-cum-Bonus List'. Previously, imports on the 'List of Items other....' were allowed mainly under the official exchange rate, which was overvalued, and imports were controlled by direct quantitative restrictions. The cash-cum-bonus system replaced these quantity restrictions by price res-

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7. Import Policy for 1966-67, (1966).

trictions. Under this scheme, half of the foreign exchange needed to import goods on this list had to be covered by bonus vouchers purchased by the importers and the remaining half was sold by the government at the official exchange rate. Along with it, the list of goods under Export Bonus Scheme was also issued by the Ministry of Commerce.

Even though the July 1967 Import Policy showed marked changes from the previous policies, one basic characteristic of the Policy remained intact, and that was government's policy of allowing easy access to some goods for imports (in this case goods on Free and Licensable Lists, imported at the official rate) as compared to others (i.e. goods on the cash-cum-bonus or the Bonus Lists allowed imports at a higher price of foreign exchange), even though the emphasis shifted from quantitative to price restrictions.

The two Import Policies of 1968, announced in January and July of that year retained the same features of the July 1967 Policy.

Along with direct controls on imports through the import Policies, there was also a detailed tariff structure operative during the period 1965-68. The rates of tariff on various commodities are listed in Pakistan Customs Tariff (1960), and the revisions of these rates from time to time can be found in Pakistan Customs Tariff (1963, 1965, 1968). "The underlying principle which

determines the rate of duty is that 'luxury' or 'non-essential' items of imports should be subjected to higher rate of duty while those of development character to lower rate of duty"[8]. An increase in almost all tariff rates occurred in November 1965 after the Indo-Pakistan war when a defence surcharge at 25% of the rate of custom duty on all imports, except that of machinery, was levied.

As Lewis[9] has argued, tariff structure is not the principal determinant of relative prices as direct import controls in the form of quotas also affect the prices of various commodities. Hence to consider underinvoicing of imports empirically, both direct controls (in the form presented in the Import Policies of Pakistan) and import tariffs have to be taken into account.

II The Possibility of Empirical Analysis[10].

In Chapter II, we discussed the incentives to underinvoice imports. Whether underinvoicing really takes place or not is difficult to determine, and even if we can somehow show the plausibility of the existence of underinvoicing of imports, it is impossible, as Bhagwati (1969) believes, to find out exactly how much underinvoicing is going on.

The technique used here to establish the existence of underinvoicing of imports in Pakistan is essen-

8. Budget of Pakistan 1968-69, (1968).
9. Lewis (1970) p. 67.
10. This section is based on Bhagwati (1969) pp. 268-272.

tially comparing partner-country trade data for Pakistan's imports for the period 1965-68. We take, for example, commodity A imported into Pakistan in 1965 from some countries. We collect Pakistan's import statistics for 1965 for commodity A. At the same time, we get the statistics of exports of commodity A to Pakistan by the exporting countries for the same year. Import data are published at c.i.f. values and usually export data at f.o.b. values. Thus <u>normally</u>, in the presence of correct invoicing, the figures reported by Pakistan of the value of its imports should exceed those of the export value figures of the partner countries for the same commodity and for the same year by the f.o.b.-c.i.f. margin. However, if the discrepancy is in the <u>perverse</u> direction, i.e. if the export value figures of partner countries exceed the import value figures of Pakistan for some commodity for some year, there exists the <u>possibility</u> that imports in Pakistan are being underinvoiced. But we are not sure of underinvoicing of imports, as this perverse discrepancy might exist for a number of other reasons:

1) Import figures may be correctly invoiced but export values in partner countries are being over-invoiced. Thus the technique can be useful only if there are reasonable grounds to assume that faking of invoices does not occur in partner countries. If, for example, we expect underinvoicing of import of some commodity, and underinvoicing is actually taking place, but partner country

figures are underinvoiced more or by the same extent as underinvoicing of imports by the home country, partner country comparison would show the normal/abnormal excess of import value figures over export value figures, giving reasons to doubt that overinvoicing of imports is taking place.

2) If imports of a commodity are rising with time, and there is a lag between the shipment of the good and its arrival in the importing country, then because of this timing problem, trade statistics may show the excess of export value figures of partner countries over the import value figures of the home country.

3) A commodity may be misclassified in trade statistics by partner countries, and the two countries may thus enter the same commodity under different categories. This might also generate the above mentioned perverse discrepancy in trade statistics.

4) There may also be misclassification from the point of view of the source of exports. For example, it is possible, that Pakistan may record some commodity's imports as imports from Canada, which are actually U.S. exports to Pakistan and recorded as such by the U.S., either because the ship bringing the commodity to Pakistan happens to be Canadian, or the commodity was loaded at a Canadian port or imports were arranged through a Canadian dealer. Then a comparison of Pakistan's import statistics of this commodity with the export statistics of U.S. would again show

such a perverse discrepancy in trade statistics. If, however, Pakistan's statistics are compared with those of Canada, we would suspect over-invoicing of imports of this commodity.

5) If import value figures are double counted, i.e. the same imports are recorded more than once from more than one country, import figures will be inflated and may lead to the disappearance of perverse discrepancies. On the other hand, more than one partner country may record the same exports to Pakistan. For example, the U.S. and Canada may both be entering some exports to Pakistan in their own trade statistics. If U.S. exports happen to go to Pakistan through Canadian ships, there may be double counting on the export side, which could generate perverse discrepancies in trade statistics, not caused by under-invoicing of imports.

6) Even the customs officials may be tampering with invoices with a view to correct them if they suspect faking. If, for example, invoices are correct, but customs officials suspecting overinvoicing of imports try to correct these invoices, partner country comparison may show the perverse discrepancies leading us to suspect under-invoicing.

The above analysis points to some of the difficulties in using this technique and drawing conclusions regarding underinvoicing of imports from the perversity of discrepancy in the partner country trade statistics.

However, if we can reasonably assure ourselves that this
perversity is not the result of the factors mentioned
above, we would have provided some plausible evidence in
support of the hypothesis that imports are underinvoiced.
Then if the perversity in the discrepancy of trade statis-
tics exists, we can proceed with the analysis of our under-
invoicing hypothesis. However, underinvoicing of imports
may actually exist but may not be large enough to reverse
the normal excess of c.i.f. import values over f.o.b.
export values. Then the simple use of this technique will
not support our underinvoicing hypothesis.

III Empirical Analysis for Pakistan 1965-68.

The purpose of the following analysis is to in-
vestigate the existence of underinvoicing of some Pakistani
imports and to consider the extent to which, if any, under-
invoicing is related to the direct import control and
tariff rate policies of the Pakistani government.

In applying the technique of partner country
comparisons of trade statistics, we tried to overcome some
of the problems involved with this technique discussed in
Part II above.

1. As the discrepancy between trade statistics in a per-
verse direction (i.e. against the normal excess of c.i.f.
import values of a commodity over its f.o.b. export
values) may very well be because of overinvoicing of ex-
ports in a partner country, we tried to include only such
countries as the import source of Pakistan which were

relatively free of quantitative restrictions on trade as compared to most of the countries in the world, thus giving us some reasonable ground to believe that the chances of faking invoices in partner countries will be small. The countries included in the analysis were U.S., Canada, Western European countries, Japan, Australia, New Zealand and, in some cases, Hong Kong. These countries also turned out to have provided Pakistan with more than 80% of its import requirements. Only for the import of tea did we include Ceylon which was the major (and sometimes the only) supplier of tea to Pakistan. Further, we examined several different commodities, a total of 36. Only in the very improbable case where all the trading partners (or most of them) were overinvoicing their exports of all those commodities expected to be underinvoiced in Pakistan, would the perverse discrepancies between trade statistics likely show overinvoicing of exports by supplying countries.

2. By selecting a large number of commodities for our analysis, the problem of misclassification of commodities under different trade categories by different countries should also decrease. Even if misclassification occurs, the probability of that happening for commodities whose import is expected to be overinvoiced should not be very different from the probability of misclassification of commodities whose import is expected to be underinvoiced.

3. If imports of a country are rising with time and there is a lag between recording shipment and recording arrival,

perverse discrepancies can exist.   Again, however, we
have no reason to expect any difference between those com-
modities we predict would be underinvoiced and those we
predict would not.   And the data suggest that import of
most commodities has been rising with time.   Furthermore,
as Bhagwati points out, this is unlikely to be a very sig-
nificant element.   "Even if trade grows at ten percent -
which is quite a generous assumption for most countries -
and the carry forward applies to a three month period, the
resulting discrepancy as a percentage of recorded trade can
not be more than about three per cent...."[11].

4.   The problem of mis-specification of the source of im-
ports and destiny of exports is handled by trying to get
the partner country statistics for one commodity for many
countries.   Even though this does not completely eliminate
the difficulty,until we include all transhipment countries,
still it reduces the chances of our deriving wrong con-
clusions from the data.

5.   If import values are double counted, that will inflate
the import figures tending to eliminate perverse discrep-
ancies, if any.   But if we still find perversity in the
discrepancy of trade statistics, double counting poses no
new problems.   On the other hand, if there is double
counting on the export side, it will tend to create per-
verse discrepancies.   However, the probability of that

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11.   Bhagwati (1969), p. 272 footnote 1.

happening for commodities expected to be underinvoiced or
overinvoiced should not differ.

Thus, if perverse discrepancies in partner
country trade statistics occur for some commodities which
can be expected to be underinvoiced when imported and do
not when the commodities are expected to be overinvoiced,
there can be some plausibility in the statement that
underinvoicing of imports is in fact taking place.

A further question remains. How do we decide
which imports we expect to be underinvoiced and which not?
Our discussion in Part I of the system of import controls
in Pakistan suggests at least two of its important aspects
relevant for our present discussion. First, the most im-
portant source of control of imports in Pakistan is the
direct control of imports of various commodities as out-
lined in various Import Policies. Second, even though
these Import Policies have been changing from time to time,
they at least indicate one thing, they specify which im-
ports the government wants to restrict   (see, however,
footnote 6). We thus rely on this information and make a
division on this basis between goods 'liberally' imported
and those whose import is 'restricted', for the group of
36 commodities selected for our analysis. And the goods
which are restricted by the government are expected to be
underinvoiced as compared to those which are liberally im-
ported. The reason for this is that direct controls on
the import of these goods lead to a price differential

between the home and the world markets, thus creating incentives to import those goods illegally (underinvoiced) to gain from this price differential.

Table I (based on various Import Policies mentioned in Part I) gives the categories of imports for the 36 selected commodities in various Import Policies announced by the Government of Pakistan during the period 1965-68. Column 1 indicates the SITC (Standard International Trade Classification used in the U.N. Commodity Trade Statistics Series 'D') Code number of the commodities. Take, for example, Meat and Preparation, which has the SITC Code no. 01. In 1965 this commodity was neither on the free list nor on the OGL list, and thus could only be imported either under the list 'Items other than those on Free List/OGL', or under the Export Bonus Scheme. The same was true for this commodity in 1966, and up to July 1967. From July 1967, as the list entitled 'Items other than those on Free List/OGL' was replaced by a 'Cash-cum-Bonus List', this commodity could thus be imported under the new cash-cum-bonus list or under the Export Bonus Scheme. This was also true for 1968.

We have computed a ratio R, contained in Table II, which is the discrepancy between the export value figures of Pakistan's partner countries and Pakistan's import value figures for the same commodity as a ratio of the exports value figures of the partner countries. (Detailed data are contained in Appendix AI). Algebraically,

TABLE I

Category of Import for Selected Commodities for Pakistan 1965-68

1 SITC Code No.	2 Commodity	3 1965	4 1966	5 1967	6 1968
01	Meat and Preparations	X[1]	X[1]	X[1]	X[1]
048	Cereal Preparation	X	X	X	X
05	Fruit and Vegetables	X	X	X	X
06	Sugar and Preps Honey	X	X	X	X
074	Tea and Mate	X	X	X	X
121	Unmanufactured Tobacco	X	X	X	X
251	Pulp and Waste Paper	X	X	X	X
262	Wool and Animal Hair	X	X	X	X
282	Iron and Steel Scrap	X	X	X	X
4	Animal Vegetable Oil, Fat	OGL List	Free List	X	X
51	Chemical Elements Compound	Free List	Free List	Free List/Licensable List[2]	Free List
541	Medicinal Products	Free List, OGL List[3]	Free List	Free List/Licensable List[2]	Free List
561	Fertilisers Manufactured	Free List	Free List	Free List/Licensable List[2]	Free List
581	Plastic Materials	X	X	X	X
629.1	Rubber Tyres, Tubes	Free List, OGL List[3]	Free, OGL Lists/X[4]	X	X
629.3	Hygenic Unhardened Rubber	X	X	X	X

1 SITC Code No.	2 Commodity	3 1965	4 1966	5 1967	6 1968
671	Pig Iron	Free List	Free List	Free List/Licensable List[2]	Free List
672	Iron Steel Primary Form	Free List	Free List	Free List/Licensable List[2]	Free List
675	Iron Steel Hoop Strip	X	X	X	X/Free List[4]
677	Iron Steel Wire Excl. Rod	Free List	Free List	Free List/Licensable List[2]	Free List
711	Power Machinery Non-Electric	X	X	X	X
712	Agricultural Machinery	OGL List	OGL List/X[4]	X/Licensable List[4]	Free List
715	Metal working Machinery	X	X	X	X
722.2	Switchgears	X	X	X	X
724	Telecommunication Equip.	X	X	X	X
729.1	Batteries and Accumulators	X	X	X	X
729.5	Electric Measuring and Controlling Equipment	X	X	X	X
674.1	Iron and Steel Heavy Plates	Free List	Free List	Free List/Licensable List[2]	Free List
674.2	Iron and Steel Medium Plates, etc.	Free List	Free List	Free List/Licensable List[2]	Free List
732.3	Lorries and Trucks	X	X	X	X
733	Road Vehicles Non-Motor	X	X	X	X
33	Petroleum and Products	X	X	Licensable List	Licensable List
864	Watches and Clocks	X	X	X	X

1 SITC Code No.	2 Commodity	3 1965	4 1966	5 1967	6 1968
821	Furniture	X	X	X	X
891	Sound Recorders, Producers	X	X	X	X
599	Chemicals Nes. (Pesticides, etc.)	Free List	Free List	Free List/ Licensable List[2]	Free List

Sources:

1. The Gazette of Pakistan, Extraordinary, (1965a)
2. The Gazette of Pakistan, Extraordinary, (1965b)
3. Import Policy for 1966-67, (1966)
4. Import Policy for the Shipping Period July-December 1967 (1967)
5. The Gazette of Pakistan, Extraordinary, (1968a)
6. The Gazette of Pakistan, Extraordinary, (1968b)

Footnotes:

1. The sign of a cross (X) indicates that import of the commodity was restricted: i.e. not importable in that particular year under any of the lists mentioned under that year for any commodity. Thus the import of a commodity is treated as restricted if not imported under Free, OGL or Licensable Lists.

2. In July 1967 Import Policy, there was no independent Free List. It was made a part of Licensable list. Hence those commodities on Free List up to July 1967 were now a part of Licensable List.

3. Some specific subdivisions of the good could be imported under one list, some under other.

4. Shows the switch of a commodity from one particular list mentioned before the slash to another mentioned after the slash in the mid year revision of Import Policy.

R is calculated in the following way;

(6.1)
$$R_i = \sum_j D_{ij} / \sum_j X_{ij}^F$$

(6.2)
$$\sum_j D_{ij} = \sum_j X_{ij}^F - \sum_j M_{ij}^P$$

where

$\sum_j X_{ij}^F$ = Sum of export value figures of Pakistan's partner countries (j countries) for commodity i

$\sum_j M_{ij}^P$ = Sum of the import value figures of Pakistan from the same partner countries (j countries) for commodity i

As the discussion of Part II illustrates, normally we should expect $\sum_j M_{ij}^P > \sum_j X_{ij}^F$, thus giving a negative

sign for R_i. If R_i has a positive sign, this will show

the discrepancy to be in the perverse direction, and thus

commodities having a positive R sign are the commodities

for which we can look into the possibility of underinvoic-

ing of imports[12].

Out of the 27 commodities for which data are

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12. Some of the R values in Table II are quite large. To check whether any of the other factors mentioned in Part II of this chapter affect the magnitude of these values, we tried to examine and compare the unit values of these commodities calculated from the Pakistani data and the partner country data. However, quantity data required to calculate these unit values are available for Pakistan only for three commodities and that also for only one year (i.e. only for 3 of the 129 observations of R). As the quantity data are not even available for any commodity for more than one year, we do not have enough information to comment on the magnitude of R values.

TABLE II

Ratio of Partner Country Data Discrepancy to the Value of Exports
of Partner Countries to Pakistan for Selected Commodities 1965-68

SITC Code No.	Commodity	R			
		1965	1966	1967	1968
01	Meat and Preparations	.20	.25	N.A.	N.A.
048	Cereal Preparations	.57	.32	.15	.24
05	Fruit and Vegetables	N.A.	.12	N.A.	.11
06	Sugar and Preps Honey	.18	N.A.	.42	.25
074	Tea and Mate	.06	.05	.50	.46
121	Unmanufactured Tobacco	.47	-1.75	.38	.59
251	Pulp and Waste Paper	-.70	-.10	-.40	-.20
262	Wool and Animal Hair	-.08	-.16	-.21	-.10
282	Iron Steel Scrap	N.A.	-.22	-1.20	-.63
4	Animal Vegetable Oil, Fat	-.10	-.82	.02	.003
51	Chemical Elements Compound	.19	.35	.36	.52
541	Medicinal Products	-.22	-.30	-.36	-.26
561	Fertilisers Manufactured	-.34	-.37	-.52	-.74
581	Plastic Materials	.11	.20	.19	.17
629.1	Rubber Tyres, Tubes	-.19	-.04	.02	.15
629.3	Hygenic Unhardened Rubber	N.A.	.55	.09	.11
671	Pig Iron	-.73	-.77	-.28	-.32
672	Iron Steel Primary Form	-.81	-.21	-.26	-.18

SITC Code No.	Commodity	R			
		1965	1966	1967	1968
675	Iron Steel Hoop Strip	.12	.32	.22	.25
677	Iron Steel Wire excluding Rod	-1.36	-.16	-.41	-.30
711	Power Machinery Non-Electric	.45	.46	.22	.17
712	Agricultural Machinery	-1.32	-.75	-.35	-1.04
715	Metal Working Machinery	.45	.38	.41	.10
722.2	Switchgear Etc.	N.A.	.31	.17	.03
724	Telecommunication Equipment	.73	.56	.21	.52
729.1	Batteries and Accumulators	N.A.	.21	.07	.23
729.5	Electric Measuring, Controlling Equipment	.73	.72	.69	.46
674.1	Iron Steel Heavy Plates etc.	N.A.	-1.27	-2.65	-.27
674.2	Iron Steel Medium Plates	N.A.	-.90	-.60	N.A.
732.3	Lorries and Trucks	N.A.	.69	.80	.74
733	Road Vehicles Non-Motor	.00	.34	.72	.08
33	Petroleum and Products	.06	-.57	-.52	-.10
864	Watches and Clocks	.04	.04	.22	.19
821	Furniture	.53	-.07	.18	.05
891	Sound Recorders, Producers	N.A.	.21	.27	N.A.
599	Chemicals Nes. (Pesticides, etc.)	-.24	-.31	-1.30	.04

N.A. = Data not available   Source: Appendix Table AI

available for 1965, 16 show a perverse (positive) sign of R

and 11 show a normal (negative) sign.   For 1966, out of a

total of 35 commodities for which data are available[13], 18

show a perverse sign of R.   There are 22 such cases out of

a total of 34 for 1967 and 22 out of 33 for 1968.

Table III relates the results of Tables I and II.

As a simple distinction, we have divided the commodities

listed in Table I into two groups.   On the basis of our

discussion in Part I, we refer to the imports of a com-

modity on the Free/OGL/Licensable List as 'Liberal' and

denote it by 'L' in Table III under the heading 'Kind of

Import Control'.   Under the same heading the imports of

commodities not on these lists (represented by a X in

Table I) is considered 'restricted', and for easy refer-

ence is denoted by X.   Under the columns 'Sign of R' in

Table III, the positive (+, indicating perverse) and

negative (-, indicating normal) sign pattern of R is

reproduced from Table II.

For the year 1965, we find that out of a total

of 17 commodities, whose import we describe as 'restric-

ted', denoted by X, using the information provided by the

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13.   The data are not available because either Pakistan
did not report any import values of these commodities, or/
and none of the partner countries report their export
value figures for Pakistan, or because the figures were
very small and not included separately in U.N. Commity
Trade Statistics which records figures separately for a
country only if the import/export value is greater than
$100,000.

TABLE III

Relationship Between Restrictiveness of Import Policies and Partner Country Data Discrepancy

SITC Code No.	Commodity	1965		1966		1967		1968	
		Kind of Imp. Control	Sign of R Table II	Kind of Imp. Control	Sign of R Table II	Kind of Imp. Control	Sign of R Table II	Kind of Imp. Control	Sign of R Table II
01	Meat and Preparations	X	+	X	+	N.A.	N.A.	N.A.	N.A.
048	Cereal Preparations	X	+	X	+	X	+	X	+
05	Fruit and Vegetables	N.A.	N.A.	X	+	N.A.	N.A.	X	+
06	Sugar and Preps. Honey	X	+	N.A.	N.A.	X	+	X	+
074	Tea and Mate	X	+	X	+	X	+	X	+
121	Unmanufactured Tobacco	X	+	X	-	X	+	X	+
251	Pulp and Waste Paper	X	-	X	-	X	-	X	-
262	Wool and Animal Hair	X	-	X	-	X	-	X	-
282	Iron and Steel Scrap	N.A.	N.A.	X	-	X	-	X	-
4	Animal Veget. Oil Fat	L	-	L	-	X	+	X	+
51	Chemical Elements Comp.	L	+	L	+	L	+	L	+
541	Medicinal Products	L	-	L	-	L	-	L	-
561	Fertilisers Manufactured	L	-	L	-	L	-	L	-
581	Plastic Materials	X	+	X	+	X	+	X	+
629.1	Rubber tyres, tubes	L	-	L/X^1	-	X	+	X	+
629.3	Hygenic Unhardened Rubber	N.A.	N.A.	X	+	X	+	X	+
671	Pig Iron	L	-	L	-	L	-	L	-
672	Iron Steel Primary Form	L	-	L	-	L	-	L	-

SITC Code No.	Commodity	1965 Kind of Imp. Control	1965 Sign of R Table II	1966 Kind of Imp. Control	1966 Sign of R Table II	1967 Kind of Imp. Control	1967 Sign of R Table II	1968 Kind of Imp. Control	1968 Sign of R Table II
675	Iron Steel Hoop Strip	X	+	X	+	X	+	X/L¹	+
677	Iron Steel Wire Exc. Rod	L	-	L	-	L	-	L	-
711	Power Mach. Non-Elec.	X	+	X	+	X	+	X	+
712	Agricultural Machinery	L	-	L/X¹	-	X/L¹	-	L	-
715	Metal Working Machinery	X	+	X	+	X	+	X	+
722.2	Switchgears	N.A.	N.A.	X	+	X	+	X	+
724	Telecom. Equipment	X	+	X	+	X	+	X	+
729.1	Batteries, Accumulators	N.A.	N.A.	X	+	X	+	X	+
729.5	Electric Meas. Cont. Equip.	X	+	X	+	X	+	X	+
674.1	Iron Steel Heavy Plates	N.A.	N.A.	L	-	L	-	L	-
674.2	Iron Steel Medium Plates	N.A.	N.A.	L	-	L	-	L	-
732.3	Lorries and Trucks	N.A.	N.A.	X	+	X	+	X	+
733	Road Vehicles Non-Motor	X	+	X	+	X	+	X	+
33	Petroleum Products	X	+	X	-	L	-	L	-
864	Watches and clocks	X	+	X	+	X	+	X	+
821	Furniture	X	+	X	-	X	+	X	+
891	Sound Recorders Producers	N.A.	N.A.	X	+	X	+	N.A.	N.A.
599	Chemical (Pesticides, etc.)	L	-	L	-	L	-	L	+

1. Indicates switch from one list of Import Policy to another in the mid year revision of Import Policy.
L = Liberal Imports, i.e. commodity is on either of Free/OGL/Licensable Lists.
X = Restricted Imports, i.e. commodity on import lists other than Free/OGL/Licensable Lists.
N.A. Data not available. - Normal R sign. + Perverse R sign.
Source: Table I, Table II.

import policies, 15 show a perverse (+) sign of R and 2

normal (-). And out of 10 liberally imported commodities,

9 have the normal sign of R and only 1 perverse. In other

words, almost 90% of those commodities which we expected to

be underinvoiced, in fact, show a perverse sign of R, and

90% of those which we did not expect to be underinvoiced

show the normal sign of R. This seems to be quite a sub-

stantial support for the hypothesis that the underinvoicing

of imports is related to the restrictive trade policies.

Almost the same holds for other years. For 1966,

out of a total of 23 commodities whose import was restric-

ted on the basis of our division, 17 show a perverse sign

of R and out of 10 liberally imported commodities, 9 have a

normal R sign[14]. For 1967, 20 of the 23 commodities which

we have termed as restricted show a perverse sign of R, and

again 9 of the 10 liberally imported commodities have a

normal R sign. For 1968, out of 22 'restricted' commodi-

ties, 19 have a perverse R sign and out of 11 liberally

imported commodities, 9 have the normal R sign.

This analysis of four years is thus consistent

in indicating that imports of commodities which were res-

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14. This covers a total of 33 commodities (23 res-
tricted plus 10 liberally imported), whereas data are
available for 35 commodities. Two commodities, Rubber
Tyres and Tubes and Agricultural Machinery were switched
from one list of imports to another in the mid-year revi-
sion of import policy. We thus can not determine whether
the import of these commodities would be underinvoiced or
not. Hence we do not discuss the sign of R for these two
commodities in our analysis. In the other years also, an
analysis of such cases is not undertaken.

tricted by the Import Policies of the government were being underinvoiced, while imports of those which were relatively liberal were not being underinvoiced. This is, however, not true for all the commodities, as we saw above. We now briefly comment on some of these exceptions.

For 1965, the two commodities out of a total of 17, which we termed as restricted and which show a normal sign of R are 'Pulp and Waste Paper' and 'Wool and Animal Hair'. For 1966 the six commodities of a total of 23 termed as 'restricted' but showing a normal sign of R are again the above mentioned two commodities plus 'Iron and Steel Scrap', 'Petroleum and Products', 'Furniture' and 'Unmanufactured Tobacco'.[15]

Recall that overvalued exchange rate creates incentives for overinvoicing of imports and direct controls in the form of import quotas create incentives for under-invoicing of imports (see discussion of Chapter II). If imports are restricted by quotas when the official exchange rate is pegged at an overvalued level, it is not certain whether the import of commodities will be under-

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15. The R sign for Unmanufactured Tobacco and Furniture is normal only for 1966, whereas for the other commodities mentioned in the paragraph, we consistently have the same sign of R for the years for which data are available, even though their imports were 'restricted' according to our definition; except for Petroleum and Products which shows a normal sign for R with its imports being liberalised in later years, thus excluding it as an exception in our analysis. As we have not been able to pinpoint the two unexpected observations for tobacco and furniture, we do not offer any explanation, and the analysis concentrates only on the other commodities.

invoiced or overinvoiced because the two forces create incentives in opposite directions.

The only explanation we have to offer is that the import of these commodities may not have been underinvoiced, because the quantitative controls were not highly restrictive.   In the case of the commodities mentioned above, we find that all of them (except Furniture, see footnote 15) are industrial raw materials. Thus even though the government restricted the supply of these commodities through imports, the restrictions may not have been tight enough to create incentives for underinvoicing of imports.   In support of this hypothesis, we can say that;

1) One of the main objectives of all Import Policies in Pakistan has been to ration the limited amounts of available foreign exchange with a view to increase the pace of economic growth and to run the domestic industries at full capacity[16]. On this basis, it would seem that the import of above mentioned industrial raw materials was not very restrictive as they were important in fulfilling this objective.

2) One of the factors which made the import of goods other than those on the Free/OGL/Licensable Lists seem restrictive was that generally, repeat licenses for the import of many of them were not granted (see discussion page 117). First, this might not in itself be restrictive in the case of some commodities (see footnote 7). Second, even repeat licenses could be granted for the import of such items which were

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16.   See various "Economic Survey[s] of Pakistan", under the chapter entitled Commercial Policy.

required by industries specified in the import policy, provided certain conditions could be satisfied (see discussion on page 118). As all the above mentioned commodities are raw materials for the domestically established industries, Repeat Licenses could have been issued for their import.

So far we have restricted this discussion to the years 1965 and 1966. The reason is that in 1967, 'List of Commodities Other than those on the Free List/OGL/Licensable List' was replaced by the Cash-cum-Bonus List. As discussed earlier (p. 122) half of the foreign exchange that was needed to import goods on this list was covered through the purchase of bonus vouchers in the market. The implicit exchange rate for the import of commodities on this list was about Rs 8.31/\$ (official rate being Rs 4.75/\$)[17]. We now also bring into picture another important factor, the rate of import duty on the various commodities included in our analysis, listed in Table IV.

In 1967, the three commodities out of a total of 23 commodities which are termed as 'restricted' but do not have a perverse sign of R are again 'Pulp and Waste Paper', 'Wool and Animal Hair' and 'Iron and Steel Scrap'. If the direct controls on their import were not highly restrictive, as argued above, the implicit price of foreign exchange at the cash-cum-bonus exchange rate (see footnote

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17. If the price of foreign exchange is Rs 11.88/\$ through the purchase of bonus vouchers (see footnote 2), then with 50% foreign exchange supplied at the official rate Rs 4.75/\$, the effective exchange rate is .5(11.88) + .5(4.75) = Rs 8.31/\$.

TABLE IV

Rates of Import Duty (%) for Selected Commodities 1965-1968[a]

(Pakistan)

SITC Code No.	Commodity	1965	1966[b]	1967	1968[c]
01	Meat and Preparations	100	125	125	125
048	Cereal Preparations	50	62.5	62.5	68.75
05	Fruit and Vegetables	35	44	44	47
06	Sugar and Preps. Honey	156[d]	256[d]	256[d]	256[d]
074	Tea and Mate	4[d]	4[d]	6[d]	7[d]
121	Unmanufactured Tobacco	135[d]	168[d]	175[d]	175[d]
251	Pulp and Waste Paper	15	18.75	18.75	29.37
262	Wool and Animal Hair	10	5	0	0
282	Iron and Steel Scrap	10	12.5	12.5	18.75
4	Animal Vegetable Oil, Fat	40	50	50	50
51	Chemical Elements Compound	35	43.75	43.75	46.85
541	Medicinal Products	7.5	9.25	9.25	10.85
561	Fertilisers Manufactured	7.5	0	0	0
581	Plastic Materials	40	50	50	75
629.1	Rubber Tyres, Tubes	50	62.5	62.5	68.75
629.3	Hygenic Unhardened Rubber	25	31.25	31.25	35.62
671	Pig Iron	10	10	10	10
672	Iron, Steel Primary Form	15	18.75	18.75	29.37
675	Iron, Steel Hoop Strip	25	31.25	31.25	40.62
677	Iron, Steel Wire excluding Rod	25	31.25	31.25	40.62
711	Power Machinery Non-Electric	25	25	25	25
712	Agricultural Machinery	5	5	5	2.5
715	Metal Working Machinery	25	25	25	32.5
722.2	Switchgears	30	37.25	37.25	38.62
724	Telecommunication Equipment	62.5	88.15	88.15	88.15
729.1	Batteries and Accumulators	50	62.5	62.5	68.75
729.5	Electric Measuring Cont. Equip.	30	37.5	37.5	38.75
674.1	Iron Steel Heavy Plates, etc.	20	25	25	32.5
674.2	Iron Steel Medium Plates	20	25	25	32.5

SITC Code No.	Commodity	1965	1966[b]	1967	1968[c]
732.3	Lorries and Trucks	35	43.75	43.75	44.37
733	Road Vehicles Non-Motor	50	62.5	62.5	68.62
33	Petroleum and Products	30	37.5	37.5	38.75
864	Watches and clocks	75	93.75	93.75	93.75
821	Furniture	100	125	125	125
891	Sound Recorders, Producers	75	93.75	93.75	96.87
599	Chemicals Nes. (Pesticides, etc.)	12.5	15.65	15.65	17.82

Source: Pakistan Customs Tariff, (1960), (1963), (1966), (1968)

a. For some of the two and three digit commodities (under the SITC code no.) there is a wide range of import tariffs for various subdivisions of the commodities. We did not include all four digit commodities (i.e. a greater subdivision) in our analysis, because (1) it increases the chance of misclassification of a commodity under different trade categories (see discussion p.   item 3) (2) the non-availability of partner country data increases with a greater breakdown and (3) it increases the number of commodities tremendously, which would be beyond the scope of this thesis. The tariff rates in these cases are selected where imports of Pakistan for some subdivision of the commodity are most concentrated. This is done in Appendix A II to this chapter.

b. Includes the defence surcharge at 25% of the rate of import duty levied in Nov. 1965, after the Indo-Pakistan war. Same holds for 1967, 1968 tariff rates.

c. Many rates of tariff were changed in June 1968 as listed in Pakistan Customs Tariff (1968). For the commodities whose rates of duty are shown to be different in 1968 as compared to 1967, the 1968 rates are derived by taking a simple average of the old rates and the new rates introduced in June 1968.

d. These rates of import duty have been converted to advalorem rates from specific rates using unit values derived from U. N. "Commodity Trade Statistics," (1965, 1966, 1967, 1968).

17), including the rate of duty on the import of these goods (which was quite low as obvious from Table IV) was less officially as compared to the then black market price (about twice the official price). Thus the introduction of cash-cum-bonus system did not tend to reverse the incentives for underinvoicing of import of these commodities, hence we continue to have normal sign of R for them in 1967 as before.

In 1968, only 'Pulp and Waste Paper' and 'Wool and Animal Hair' were on the 'restricted' lists and show a normal sign of R. The analysis for them for 1967 also holds for 1968.

Chemical Elements, etc., is the commodity showing, on the other hand, a perverse sign of R which was expected to be overinvoiced being on the Free/Licensable list and termed as 'liberal' in Table III, for all the years 1965-68. If we look at Table IV, showing rates of import duty for various commodities, we find that there are different rates of duty for different chemicals (SITC code no. 51 and 599); and chemical elements actually had the highest rate of import duty among all chemicals imported during this period[18].

A plausible explanation for this can be, that even though, chemical elements were expected to be overinvoiced, they were actually being declared as other

18. See Pakistan Customs Tariff, (1966), (1968).

chemicals with lower rates of import duty, thus saving

duty on their imports and were thus in fact being under-

invoiced.   For 1968, however, chemical compounds also

show a perverse sign of R and of a very small magnitude,

which could either be caused because of the timing problem

(see p. 125) or may be because of the same reason as for

chemical elements.

To recapitulate, the sign of R can become per-

verse for a number of reasons.   Only when this sign is

shown to be affected by import controls, can we say that

the perversity of R exists because of underinvoicing of

imports.   And from our earlier discussion, it is clear

that for most of the observations, the sign of R is re-

lated to the quantitative controls on imports as outlined

in the Import Policies of Pakistan. We also tried to pro-

vide an explanation in those cases where this relationship

does not seem to hold.   There is thus a strong presumption

that underinvoicing of some of Pakistani imports existed

during the period 1965-68.

Using regression analysis, we now wish to test

the hypothesis more rigorously whether or not there

existed any relationship between underinvoicing of im-

ports and the restrictiveness of imports through direct

controls (as outlined in the Import Policies of the govern-

ment) and tariff on imported commodities.   The hypothesis

tested is

$$R = \alpha_1 + \alpha_2\, D1966 + \alpha_3\, D1967 + \alpha_4\, D1968 +$$
$$\beta_1\, MC + \beta_2\, (MCD1966) + \beta_3\, (MCD1967) + \beta_4\, (MCD1968) +$$
$$\gamma_1\, TR + \gamma_2\, (TRD1966) + \gamma_3\, (TRD1967) + \gamma_4\, (TRD1968)$$

where R is as defined earlier

MC = Import Category of the commodity. It is a dummy
variable which takes a value zero if the import of
the commodity is labelled as liberal (represented by
an L) and a value 1 if it is termed restricted
(represented by an X) in Table TII.

TR = Rate of import tariff on the commodity.

D_i = Dummy variable with a value 1 in the ith year and zero
otherwise; i = (1966, 1967, 1968)

MCD_i = Product of MC and D_i for ith year; i = (1966, 1967,
1968)

TRD_i = Product of TR and D_i for ith year; i = (1966, 1967,
1968)

In words, our hypothesis is that underinvoicing of imports
(R) is a function of the import category of the commodity
in the various Import Policies (MC) and the rate of
tariff (TR). The dummies D_i have been included, three of
them in all, to pick up any changes in the intercept (re-
presented by $\alpha1$, which would become the intercept for the
year 1965) of the equations over the years 1966-1968 which
might have been brought about by changes in the restrictive-
ness of the system over that period or any special occur-
rences during any year. Similarly, the variables MCD_i and

TRD_i have been included to pick up changes in the slopes of the equation over the years. The above procedure is equivalent to estimating four different equations for four years. This procedure has, however, the advantage that it is possible to determine, using the t test, whether the changes over the years are significant or not.

To run this regression, we pool the cross-section and time-series data. Thus the series R consists of all R observations in Table II for 36 commodities and for four years, 1965-68. Due to the non-availability of the data for some commodities for some years, the total number of observations is 129 (instead of 144 if no data had been missing). The estimated equation is (results of all estimated equations are recorded in Table V),

$$R = -.5742 + .1665 \ D1966 - .1240 \ D1967 + .2832 \ D1968$$
$$\quad (3.80) \quad (.78) \qquad\quad (.59) \qquad\quad (1.34)$$

$$+ .6404 \ MC + .1035 \ (MCD1966 + .1077 \ (MCD1967)$$
$$\quad (3.23) \qquad (.38) \qquad\qquad (.39)$$

$$- .3007 \ (MCD1968) + .0030 \ TR - .0069 \ (TRD1966)$$
$$\quad (1.10) \qquad\qquad (1.22) \qquad (2.12)$$

$$- .0009 \ (TRD1967) - .0012 \ (TRD1968)$$
$$\quad (.32) \qquad\qquad (.40)$$

(Regression 1)

(Figures in the paranthesis are t ratios)

The intercept and the coefficient of MC are significant at 5% level[19]. The tariff rate does not turn out to be

_____

19. The t test is a two tail test.

TABLE   V

Relationship Between Underinvoicing of Imports and
Direct Import Controls and Import Tariffs
- Results of Regression Analysis

Regression No.	α_1	α_2	α_3	α_4	β_1	β_2	β_3	β_4	γ_1	γ_2	γ_3	γ_4	R^2
1	-.5742 (3.80)	.1665 (.78)	-.1240 (.59)	.2832 (1.34)	.6404 (3.23)	.1035 (.38)	.1077 (.39)	-.3007 (1.10)	.0030 (1.22)	-.0069 (2.12)	-.0009 (.32)	-.0012 (.40)	.3709
2	-.6157 (4.15)	.1046 (.51)	-.1188 (.58)	.2581 (1.23)	.6633 (3.70)	-.0832 (.32)	-.0272 (.10)	-.3834 (1.50)	.3458 (1.98)	-.2746 (1.15)	.0833 (.34)	-.0144 (.05)	.4046
3	-.6259 (4.03)	.1323 (.60)	-.0938 (.43)	.2912 (1.33)	.5616 (2.75)	.0533 (.19)	.1541 (.54)	-.2887 (1.00)	.2278 (1.89)	-.2325 (1.45)	-.0911 (.55)	-.0604 (.35)	.3676
4	-.5527 (7.75)				.5332 (5.95)				.2898 (3.50)				.3654
5	-.5430 (7.15)				.5502 (5.67)				.1227 (2.17)				.3285

Figures in the paranthesis are t ratios

significant. At 5% level, intercept changes over the
years as represented by D_i are not significantly different
from zero. The same is true of changes in the coefficient
of MC, represented by MCD_i. Except for TRD1966, repre-
senting change in the coefficient of TR in 1966, all other
TRD_i (i = 1967, 1968) are also not significantly different
from zero. All the significant variables have expected
signs except for TRD1966, which would yield a negative
coefficient for the tariff rate for 1966 (i.e. -.0039 =
+ .0030 - .0069). The tariff rate thus turns out to be
either insignificant, or significant with a sign, which
from first thoughts would seem unexpected. There are,
however, two possible explanations for this. First, as
already pointed out above and argued by Lewis[20], the tariff
structure played a minor role in determining domestic prices
in the presence of direct import controls during the period
1965-68. Second, because we are using the cross-section
data, it is possible that goods with a higher tariff may
have been underinvoiced no more, or sometimes even less,
depending upon the nature of the commodity. Some com-
modities may be underinvoiced more than others simply be-
cause of the ease of underinvoicing them due to the parti-
cular nature of those commodities; hence the insignificance
or unexpected sign for tariff rate.

To take care of this problem, we thought that

20. Lewis (1970) p. 67.

goods in a higher tariff rate category may be underinvoiced
more than those in the lower tariff rate category. We
then use these categories as a dummy variable TC in our
estimation instead of TR, the actual tariff rates, and
our new hypothesis becomes:

$$R = \alpha_1 + \alpha_2 \ D1966 + \alpha_3 \ D1967 + \alpha_4 \ D1968 +$$
$$\beta_1 \ MC + \beta_2 \ (MCD1966) + \beta_3 \ (MCD1967) + \beta_4 \ (MCD1968) +$$
$$\gamma_1 \ TC_i + \gamma_2 \ (TC_i D1966) + \gamma_3 \ (TC_i D1967) + \gamma_4 \ (TC_i D1968)$$

Where the subscript i for TC is used to distinguish one
kind of tariff rate division into different categories
from the other. In our first such division, we put the
tariff rates into two categories. All goods having a rate
of tariff of 35% or above are put into category 1 and zero
otherwise, and use these categories as a dummy variable
TC1 in our regression 2. In the second division, all
goods having the rate of tariff of up to 20% are put into
a category zero in the dummy TC2, a category 1, if tariff
rate is between 21-49% and a category 2 otherwise and use
TC2 in our Regression 3. The results for these two
regressions are;

$$R = - \underset{(4.15)}{.6157} + \underset{(.51)}{.1046} \ D1966 - \underset{(.58)}{1188} \ D1967 + \underset{(1.23)}{.2581} \ D1968$$
$$+ \underset{(3.70)}{.6633} \ MC - \underset{(.32)}{.0832} \ (MCD1966) - \underset{(.10)}{.0272} \ (MCD1967)$$
$$- \underset{(1.50)}{.3834} \ (MCD1968) + \underset{(1.98)}{.3458} \ TC1 - \underset{(1.15)}{.2746} \ (TC1D1966)$$

+ .0833 (TC1D1967) - .0144 (TC1D1968)
  (.34)   (.05)

(Regression 2)

$R = - .6259 + .1323$ D1966 $- .0938$ D1967 $+ .2912$ D1968
     (4.03)   (.60)   (.43)   (1.33)

    + .5616 MC + .0533 (MCD1966) + 1541 (MCD1967)
      (2.75)   (.19)   (.54)

    - .2887 (MCD1968) + .2278 TC2 - .2325 (TC2D1966)
      (1.00)   (1.89)   (1.45)

    - .0911 (TC2D1967) - .0604 (TC2D1968)
      (.55)   (.35)

(Regression 3)

In Regression 2, the intercept, and the variables
MC and TC1 all turn out to be significant at 5% level.
The same is true of the intercept, and MC in Regression 3.
TC2, however, is significant only 10% level. In both
these regressions, all the coefficients representing changes
in intercept or changes in slopes are not significantly dif-
ferent from zero. We thus rerun our regressions dropping
all these insignificant variables. Then our new regres-
sions corresponding to the above two regressions are:

$R = - .5527 + .5332$ MC $+ .2898$ TC1   (Regression 4)
     (7.75)   (5.95)   (3.50)

$R = - .5430 + .5502$ MC $+ .1227$ TC2   (Regression 5)
     (7.15)   (5.67)   (2.17)

In Regression 4, we find that the intercept and the vari-
ables MC and TC1 are all significant at 5% level. Again,

the intercept and the variables MC and TC2 are significant
at 5% level in Regression 5.   TC1 and TC2 appear with the
expected positive signs.

The significance of MC, TC1 and TC2 in the
regressions indicates that R is in fact related to import
controls and supports the hypothesis that underinvoicing
of imports which existed in Pakistan during the 1965-68
period was a function of the direct import control poli-
cies of the government.   The relations of underinvoicing
to the tariff rate policy of the government is less clear
cut.   Even though our analysis gives support to the
hypothesis that imports of commodities in the higher tariff
rate categories is underinvoiced more, we have not been
able to relate underinvoicing of imports to the actual
tariff rates (in Regression 1).

We now explain in some detail our two selected
equations, Regression 4 and 5, and comment on the magni-
tudes of their coefficients with the help of Tables VI and
VII, derived using Regressions 4 and 5 respectively.   As
both MC and TC1 can either take a value zero or 1, there
are four different possible ways in which they can be com-
bined.   Using Regression 4, and these different combina-
tions of MC and TC1, we have derived the values of R in
Table VI.   Similarly the R values in Table VII are de-
rived using Regression 5 and different combinations of MC
and TC2.   Consider Regression 4 first.

1) MC = 0, TC1 = 0; If the import of a commodity satisfied

these conditions, it means that the commodity could be imported at the official overvalued exchange rate, without many quantitative restrictions (i.e. a commodity on the Free List/OGL Lists of the Import Policies) and with a low tariff rate (less than 35%). We expect overinvoicing of imports of this commodity and thus a negative value of R of a magnitude not accounted for by the excess of c.i.f. over f.o.b. import values. In Table VI, the value of R under these conditions turns out to be -.5527. Even if we allow for transportation, insurance and freight costs of about 10% of the value of imports, the calculated R value is much larger than this, supporting our hypothesis of overinvoicing of imports of such a commodity.

2) MC = 1, TC = 1; On the other extreme consider a commodity which faced either quantitative restrictions on its imports (i.e. a commodity on the list entitled 'List of commodities other than those on the Free List' in the Import Policies of Pakistan) or price restrictions in the form of higher exchange rate (i.e. a commodity covered by Export Bonus Scheme), and is in our high tariff rate category (e.g. faced a rate of tariff of 35% or above). We expect this commodity to be underinvoiced, and thus have a positive R value. Our Table VI gives an R value of .2703 to such a commodity, which is according to our expectations of underinvoicing of imports of the commodity (in the presence of correct invoicing R should be -.10, if again we assume c.i.f. excess of 10% over f.o.b. values).

3) MC = 1, TC = 0; We now have a commodity whose imports were restricted quantitatively, or faced a higher exchange rate and is in the lower tariff rate category. The calculated value of R in this case is -.0195, indicating underinvoicing of imports of such a commodity if c.i.f. values exceed f.o.b. values by more than 1.95%. In the case of such a commodity, a comparison with (2) suggests that shifting the commodity from a higher tariff rate to a lower tariff rate category decreases underinvoicing of imports, which is what we would expect.

4) MC = 0, TC = 1; A commodity satisfying these conditions was imported at the overvalued exchange rate without many quantitative restrictions, but faced a rate of tariff of 35% or above. The R value in this case is -.2629, suggesting overinvoicing of imports of such a commodity (unless c.i.f. values exceed f.o.b. values by 26.29% or more). Compared with our results in (1), we again find that putting the commodity into a higher tariff rate category decreases overinvoicing of imports of such a commodity, which is consistent with our results in (3).

Table VII yields the same kind of results (even though the magnitudes are slightly different due to our use of different variables), namely that the imposition of quantitative or price restrictions on the imports of a commodity (shifting the commodity from MC = 0 to MC = 1 i.e. from Free List to restricted lists in the Import Policies) and/ or shifting the commodity to a higher tariff rate category

TABLE VI

CALCULATED VALUES OF "R" USING REGRESSION 4 FOR
DIFFERENT COMBINATIONS OF MC, TC 1

MC TC1	Liberal = 0	Restricted = 1
Low = 0 (<35%)	-.5527	-.0195
High = 1 (>35%)	-.2629	.2703

TABLE VII

CALCULATED VALUES OF "R" USING REGRESSION 5 FOR
DIFFERENT COMBINATIONS OF MC, TC2

MC TC2	Liberal = 0	Restricted = 1
0 (< 20%)	-.5430	.0072
1 (21%-49%)	-.4203	.1155
2 (> 50%)	-.2976	.2382

would induce underinvoicing of imports of such a commodity.

Conclusion:

The main purpose of this chapter was to investigate the question of underinvoicing of some of the imports of Pakistan in the period 1965-68, and to relate this underinvoicing of imports to the kind of import control policies followed by the government of Pakistan during that period.

Our analysis in Section III supports the hypothesis that underinvoicing of imports in Pakistan existed during the period 1965-68. We were able to demonstrate, with the help of regression analysis, that import controls in Pakistan as they existed in the form of Import Policies during that period, significantly affected underinvoicing of imports. We also demonstrated the plausibility of the hypothesis that goods in the higher tariff rate categories were more prone to underinvoicing. However, we were not successful in relating underinvoicing of imports to the tariff rates themselves.

APPENDIX AI

Partner Country Trade Data for Pakistan for Selected
Commoties 1965-68

The data in the following pages have all been
taken from the U.N. Commodity Trade Statistics Series D.
There are some figures in the appendix which appear with
either a (*) or a (**).   The import data with a (*) have
not been reported by Pakistan when the corresponding export
value data from partner countries were available.   These
data are then derived one way or the other from Pakistan's
reported data in the U.N. Commodity Trade Statistics, as
explained below.

If a partner country reports some exports to
Pakistan, but no imports are recorded by Pakistan from
that country, then we try to find out the maximum possible
declared value of imports in Pakistan from that country, as
can be derived from Pakistan's recorded import data.   If
this maximum is less than that reported by the partner
country, we have an observation where the discrepancy be-
tween import and export figures is in perverse direction,
and hence we have an observation which is a candidate for
our analysis of underinvoicing of imports of that com-
modity.   These are the derived figures marked with a (*).
If the maximum possible declared value of imports in
Pakistan is greater than the corresponding export value of
partner countries, we can not conclude anything unless we

can somehow deduct the exact declared import figures in

Pakistan, a proposition which we did not undertake, and

hence those observations are not included.

As an example for the derivation of these figures,

take the case of Telecommunication Equipment; SITC Code

no. 724.   Canada reported exports worth US$552

thousand of this commodity to Pakistan in 1968.   Pakistan

does not record import values of this commodity from

Canada.   However, Pakistan's recorded total import value

of this commodity was $10277 thousand, and its recorded

total import values of this commodity sum up to $10156

thousand from Western Europe, Eastern Europe, U.S. and

Japan, leaving a maximum possible declared value of im-

ports from Canada of $121 thousand, a figure far smaller

than that reported by Canada.

The figures with a (**) are on the other hand not

reported by Pakistan's trading partners, whereas the cor-

responding import values are recorded by Pakistan for

these commodities.

Again we try to derive the maximum possible

value of the exports of this commodity to Pakistan by a

partner country.   If this maximum is less than the import

value recorded by Pakistan, we have an observation which

is a candidate for 'no underinvoicing of imports' of this

commodity.   If, however, this maximum is greater, we again

can not conclude anything unless we can find the exact

export value figure of the partner country, and hence such

observations are again left out.

The mnemonics used in the next few pages are defined below:

M_i^P = Import values as recorded by Pakistan for commodity i

X_i^F = Export values as recorded by partner countries for commodity i

$$D_i = X_i^F - M_i^P \qquad\qquad R_i = \sum_j Dij / \sum_j X_{ij}^F$$

where i represents the commodity and j, the country.

SITC Code No.	Commodity	Country of Export	1965 MP	1965 XF	1965 D	1965 R	1966 MP	1966 XF	1966 D	1966 R	1967 MP	1967 XF	1967 D	1967 R	1969 MP	1969 XF	1969 D	1969 R
01	Meat and preparations	U.S.	102	129	27	.20	143	191	48	.25	n.a.	n.a.	--	--	n.a.	--	--	--
048	Cereal preparation	U.K.	651	627	-24		403*	639	156		407	574	87		423	557	134	
		U.S.	101*	1,151	1,051		54*	146	92		n.a.	--	--		n.a.	--	--	
		Total	752	1,770	1,026	.57	537	785	248	.32	467	574	87	.15	423	557	134	.24
05	Fruit and vegetables	U.S.	n.a.	--	--		142	108	-34		n.a.	--	--		300	n.a.	45	
		Netherlands	--	--	--		344	443	99		n.a.	--	--		300	425	45	
		Total	n.a.	--	--	--	486	551	65	.12	n.a.	--	--	--	300	425	45	.11
06	Sugar and preps honey	France	274	333	59		n.a.	--	--		n.a.	--	--		109	228	39	
		Hong Kong	n.a.	n.a.			n.a.	--	--		n.a.	--	--		69*	118	49	
		Netherlands	n.a.	n.a.			n.a.	--	--		n.a.	129	138		258	346	88	
		Total	274	333	59	.18	n.a.	--	--	--	191	129	130	.42	223	419	196	.25
074	Tea and maté	Ceylon	238	253	15	.06	540	574	26	.05	534	1,080	546	.50	223	419	196	.46
121	Tobacco unmanufactured	U.S.	1,184	2,260	1,076	.47	1,056	675	-1,181	-1.75	1,719	2,801	1,082	.38	1,623	2,698	1,075	.39
251	Pulp and waste paper	Canada	2,452	1,254	-1,198		1,031	1,263	232		2,625	1,709	-916		1,117	654	-463	
		U.S.	341	226	-115		n.a.	--	--		146	104	-42		765	930	165	
		Denmark	109	7	-102		760	354	-394		304	378	74		236	150	-86	
		Sweden	622	567	-255		n.a.	--	--		n.a.	--	--		n.a.	--	--	
		Norway	251	244	-7		n.a.	--	--		n.a.	--	--		n.a.	--	--	
		Finland	169	143	-26		n.a.	--	--		n.a.	--	--		n.a.	--	--	
		Total	4,144	2,441	-1,703	-.70	1,019	1,657	-162	-.10	3,075	2,191	-884	-.40	2,136	1,764	-354	-.20
262	Wool and animal hair	U.K.	1,628	1,641	13		2,829	2,459	-369		1,753	1,484	-269		1,809	1,636	-173	
		Australia	1,481	1,214	-267		1,682	1,372	-310		2,510	2,019	-491		1,544	1,362	-182	
		Japan	614	590	-24		466	396	-10		400	334	-66		682	677	-5	
		Total	3,723	3,445	-278	-.09	4,916	4,227	-689	-.16	4,663	3,637	-826	-.21	4,035	3,675	-360	-.10
282	Iron steel scrap	U.S.	n.a.	--	--		444	452	8		460	36**	-432		833	457	-376	
		Germany	n.a.	--	--		n.a.	--	--		129	166	37		204	148**	-56	
		U.K.	n.a.	--	--		539	749	-169		115	103	-12		523	352	-171	
		Australia	n.a.	--	--		502	801	-101		1,356	635	-721		1,560	957	-603	
		Total	n.a.	--	--	--	2,068			-.22	2,060	940	-1,120	-1.20				-.63
4	Animal, vegetable oil, fat	U.S.	41,053	37,034	-4,019		26,486	12,173	-14,313		26,489	29,717	3,220		28,963	29,091	128	
		Germany	1,193	1,404	215		2,159	1,079	-260		1,491	1,038	-453		166	138	-28	
		U.K.	350	219	-132		267	310	51		607	292	-115		208	216	8	
		Canada	1,057	935	-122		2,286	2,000	-286		2,063	1,533	-530		n.a.	--	--	
		Denmark	n.a.	105	35		939	1,132	193		1,601	1,326	-475		n.a.	--	--	
		Total	43,011	39,841	-3,970	-.10	32,137	17,502	-14,555		33,121	33,040	719	-.82	29,337	29,445	100	.02
51	Chemical elements, compounds	U.S.	1,064	3,795	2,751		951	2,070	1,919		1,565	7,352	5,787		2,760	8,357	5,637	
		Belgium	174	129	-45		161	822	661		227	103	-124		514	2,199	1,685	
		France	642	995	353		1,021	1,834	590		1,561	1,154	-407		6,122	4,401	-1,594	
		Germany	3,019	3,926	107		4,300	4,372	479		4,456	3,563	-693		172	2,905	2,733	
		Italy	316	400	72		1,110	475	-746		270	553	283					
		Sweden					47	475	420		n.a.	--	--		4,562	4,714	132	
		U.K.	4,948	4,370	-578		2,465	2,746	281		5,074	4,227	-847		194	333	139	
		Switzerland	348	226	-122		225	222	-3		940	160	-71		1,000	6,915	7,627	
		Japan	905	1,357	372		737	2,092	2,155		540	5,438	4,490					
		Total	12,256	15,206	2,910	.19	10,761	16,533	5,772	.25	14,340	22,558	8,218	.35	15,327	31,546	16,619	.52

SITC Rev. No.	Commodity	Country of Export	1965 N^b	1965 X^f	1965 D	1965 R	1966 N^b	1966 X^f	1966 D	1966 R	1967 N^b	1967 X^f	1967 D	1967 R	1968 N^b	1968 X^f	1968 D	1968 R
541	Medicinal products	U.S.	4,517	4,215	-232		4,155	2,200	1,866		4,671	3,411	-1,260		3,926	3,169	-757	
		Germany	3,576	2,427	-1,149		2,203	1,600	-603		2,621	1,875	-746		4,751	2,629	-1,032	
		Belgium	804	737	-67		757	678	-79		765	545	-200		330	217	6	
		France	350	287	-63		216	220	-12		376	260	-116		373	243	-59	
		U.K.	627	407	-40		373	264	-109		464	303	-161		527	359	-126	
		Denmark	4,604	3,704	-900		2,579	2,337	-242		3,132	2,628	-504		387	237	-150	
		Switzerland	2,615	2,079	-536		1,314	1,203	-111		1,319	975	-344		1,775	2,001	226	
		Japan	566	396	-170		1,357	1,468	111		1,600	1,225	-375		635	594	-41	
		Hong Kong	n.a.	—	—		375	295	-87		401	271	-130		464	243	-221	
		Total	16,177	15,052	-3,325	-.22	12,740	9,777	-2,971	-.30	15,206	11,276	-4,010	-.36	16,507	13,517	-4,470	-.26
561	Fertilizers manufactured	U.S.	2,566	2,645	-521		26,510	22,036	-4,474		16,050	14,343	-2,507		10,390	10,222	-276	
		Canada	n.a.	—	—		545	254	-291		n.a.	—	—		1,060	325	-216	
		Belgium	650	534	-124		640	20	-920		n.a.	—	—		325	462	-157	
		France	n.a.	—	—		648	104	-744		n.a.	—	—		1,730	0	-1,730	
		Germany	1,301	909	-272		2,310	1,165	-1,153		1,252	1,170	-82		5,110	2,047	-3,263	
		Italy	1,360	1,166	-254		1,912	2,157	245		n.a.	—	—		5,529	19	-1,046	
		Japan	205	81	-201		2,609	100	-1,900		5,054	114	-4,940		n.a.	—	—	
		Greece	n.a.	—	—		n.a.	—	—		654	0	-654		—	—	—	
		Sweden	n.a.	—	—		562	0	-562		—	—	—		n.a.	—	—	
		Total	6,250	4,675	-1,575	-.34	35,631	25,932	-9,669	-.37	23,810	15,627	-8,163	-.52	25,259	14,514	-10,745	-.74
581	Plastic materials	U.S.	724	569	-135		394	516	122		678	724	46		309	315	6	
		France	415	496	81		619	590	-29		379	530	151		267	240	-27	
		Germany	1,527	2,094	567		1,431	1,900	469		1,435	1,689	254		1,442	1,686	244	
		Italy	831	512	81		961	830	-141		810	791	-15		1,010	936	-74	
		U.K.	1,141	1,201	62		403	966	563		872	1,121	249		1,093	1,063	-30	
		Japan	1,969	2,133	164		2,154	2,054	600		1,936	2,676	740		1,749	2,646	1,022	
		Total	6,607	7,427	820	.11	6,122	7,704	1,582	.20	6,110	7,531	1,421	.19	5,070	7,086	1,216	.17
629.1	Rubber Tires, Tubes	U.S.	4,039	3,206	-740		3,972	2,969	-1,003		1,261	839	-422		206	253	47	
		France	n.a.	—	—		270	296	10		030	504	74		212	271	259	
		U.K.	1,637	1,342	-295		304	556	172		469	515	46		339	164	635	
		Japan	1,005	1,648	-157		1,004	1,584	570		1,102	1,504	402		3,549	4,154	635	
		Total	7,476	6,272	-1,200	-.19	5,640	5,405	-235	-.04	3,662	3,762	100	.02	4,806	5,634	678	.15
629.3	Hygenic unhardened rubber	Japan (Total)	n.a.	—	—	—	322	585	263	.55	712	785	73	.09	660	996	166	.11
671	Pig Iron	U.S.	2,155	1,244	-911		466	139	-327		313	156	-157		n.a.	—	—	
		Germany	n.a.	—	—		144	107	-37		357	237	-66		n.a.	—	—	
		Norway	n.a.	—	—		164	192	20		452	401	-51		270	171	-59	
		U.K.	n.a.	—	—		n.a.	—	—		323	295	-33		146	144	-2	
		Total	2,155	1,244	-911	-.73	774	430	-336	-.77	1,396	1,009	-307	-.20	416	315	-101	-.32
672	Iron steel, primary form	U.S.	24,870	13,629	-11,241		7,665	6,944	-721		17,571	16,325	-1,240		25,822	24,200	-1,442	
		Belgium	808	527	-201		131	74	-57		604	326	-358		455	560	-116	
		France	n.a.	—	—		n.a.	—	—		361	39	-342		110	49	-131	
		Germany	700	713	-105		154	125	-69		211	362	151		103	103	-1,000	
		U.K.	976	322	-654		5,369	4,536	-1,473		1,251	1,295	-906		1,665	2,071	-1,704	
		Australia	n.a.	—	—		369	102	-107		2,404	82	-1,109		1,119	717	-422	
		Japan	n.a.	—	—						619	0	-736		569	92	-417	
		Denmark	n.a.	—	—						116	0	-116		n.a.	—	—	
		Total	27,452	15,191	-12,261	-.01	14,299	11,861	-2,430	-.21	23,519	16,695	-4,024	-.26	33,052	27,972	-5,030	-.10
675	Iron steel, hoop strip	U.S.	2,040	2,040	0		n.a.	—	81		109	142	-40		337	471	134	
		Germany	55	431	376		253	339	000		600	074	266		n.a.	—	—	
		Italy	n.a.	—	—		700	1,500	800		n.a.	—	—		n.a.	—	—	
		Sweden	n.a.	—	—		706	598	108		133	171	39		169	244	56	
		Total	2,095	3,271	376	.12	1,659	2,432	773	.32	930	1,100	250	.22	525	715	190	.25
677	Iron steel wire, excluding rod	Belgium	1,605	642	-1,043		263	205	22		364	437	73		354	425	71	
		Germany	2,040	735	-1,313		168	164	-4		302	255	-07		901	250	-643	
		U.K.	866	490	-396		414	266	-140		300	157	-157		196	144	-52	
		Japan	3,302	1,480	-1,622		610	547	-71		509	541	-541		799	854	95	
		Total	7,921	3,347	-4,574	-1.36	1,463	1,262	-401	-.16	2,015	1,430	-505	-.41	2,250	4,721	-529	-.10

(cont'd.)

SITC Code No.	Commodity	Country of Export	1965 M^p	X^F	D	R	1966 M^p	X^F	D	R	1967 M^p	X^F	D	R	1969 M^p	X^F	D	R
711	Power machinery, non-electric	U.S.	3,154	10,011	6,807		6,062	7,396	534		7,769	5,046	-1,923		3,798	6,161	2,363	
		Canada	726	1,172	446		135	151	14		185*	211	46		1,072	1,324	252	
		France	46	271	225		129	151	26		1,457	2,511	1,054		5,755	11,455	5,700	
		Italy	260	494	226		1,610	3,005	1,395		4,605	6,505	1,900		5,809	1,544	-4,345	
		U.K.	4,043	6,691	2,648		1,342	7,203	5,665		3,629	4,643	1,014		3,024	6,394	-2,013	
		Japan	2,419	1,012	-1,607			2,352	1,010		1,132	2,061	927		724	357	-2,337	
		Switzerland	139	106	-67		n.a.				149*	346	197		720	357	337	
		Total	10,757	19,649	8,892	.45	10,036	18,730	0,644	.46	10,926	24,343	5,417	.22	27,205	32,069	5,664	.17
712	Agricultural machinery	U.S.	8,636	1,930	-6,706		6,196	1,767	-4,429		6,506	5,261	-1,245		6,098	2,663	-3,435	
		Germany	2,202	759	-1,523		1,218	946	-272		3,100	1,751	-1,439		2,298	1,445	-853	
		Italy					525	1,007	482		3,310	1,522	-1,808		444	347	-97	
		U.K.	4,901	3,901	-1,000		7,301	4,616	-2,748		10,691	8,415	-2,279		5,169	2,029	-3,160	
		Japan	343	323	-20		403	212	-212		756	1,100	344		600	669	69	
		Total	16,242	6,993	-9,249	-1.32	15,726	8,971	-6,755	-.75	24,476	10,049	-6,427	-.35	14,629	7,173	-7,456	-1.04
715	Metal-working machinery	U.S.	795	2,091	1,296		1,249	1,637	388		450	562	512		707	795	11	
		France	360	223	-145		200*	432	232		1,464	2,635	1,171		1,120	1,242	122	
		Germany	2,016	2,959	943		1,363	2,493	1,130		2,201	3,429	660		2,068	1,794	-274	
		Italy	204	263	-21						239	260	310		736	629	-153	
		U.K.	1,296	2,017	721		001	012	11		658	1,160	310		728	624	-104	
		Switzerland					141	338	197		698	2,671	1,973		1,905	1,710	195	
		Japan	1,645	4,509	2,664		757	524	771		631	2,973			1,272	1,310	1,046	
		Total	6,604	12,062	5,450	.45	4,511	7,240	2,729	.30	7,113	12,059	4,946	.41	7,616	8,415	799	.10
722.2	Switch gears, etc.	U.S.	n.a.	n.a.	n.a.		2,336	3,511	1,175		1,650	2,403	753		2,237	1,162	-775	
		Canada	n.a.	n.a.	n.a.		73	663	590		418	1,149	731		1,130	1,156	14	
		France	n.a.	n.a.	n.a.		n.a.				524	1,243	719		1,584	1,608	-154	
		Germany	n.a.	n.a.	n.a.		1,572	1,737	165		2,290	1,754	-546			2,050	464	
		Italy	n.a.	n.a.	n.a.		147	668	721		698	1,019	-321		1,040	1,400	-372	
		U.K.	n.a.	n.a.	n.a.		1,754	2,178	424		2,314	1,983	-331		449	1,475	1,026	
		Switzerland	n.a.	n.a.	n.a.		395	2,128	-267									
		Total					6,277	9,015	2,088	.31	8,094	9,751	1,657	.17	8,731	9,027	296	.03
724	Telecommunication equipment	U.S.	450	2,372	1,914		1,749	2,379	630		1,412	1,207	-205		513	3,683	2,573	
		France	n.a.	1,642	161		20*	361	341		225	711	460		111	3,164	3,053	
		Germany	1,481				2,577	1,730	-047		2,050	2,425	-425		274	502	-71	
		Italy					0*	360	360		77*	684	507		911	3,127	2,216	
		U.K.	314	1,347	1,033		1,531	2,603	1,152		1,247	3,160	1,913		936	139	-797	
		Switzerland	n.a.	5,815	5,058		111	239	120		3,105	3,203	63		3,231	4,376	1,140	
		Japan	757				30*	105	-267		299	373	-67		3,121*	4,552	451	
		Canada	n.a.	132			n.a.				216	157	157					
		Total	3,010	11,176	0,166	.73	4,099	14,913	10,864	.56	9,422	11,951	2,529	.21	8,116	16,893	6,777	.52
729.1	Batteries and accumulators	U.S.	n.a.	n.a.	n.a.		656	253	-403		119	128	9		321	311	-10	
		Germany	n.a.	n.a.	n.a.		148	302	164		249	305	56		292	408	116	
		U.K.	n.a.	n.a.	n.a.		324	533	209		404	343	-61		417	500	166	
		Japan	n.a.	n.a.	n.a.		203	559	356		156*	227	71		600	530	353	
		Total	n.a.	n.a.	n.a.		1,331	1,667		.21	920	1,003	75	.07	1,199	1,552		.23
729.5	Electric measuring controlling equipment	U.S.	129	746	617		156	573	417		136	910	774		530	1,394	664	
		France	n.a.				102	704	522		61*	571	510		252	359	216	
		Germany	320	718	393		126	435	309		175	553	374		331	502	150	
		U.K.	178	606	428		142	397	255		205	310	113		866	1,155	251	
		Japan	59*	384	325		30*	185	155		202	495	213		55*	101	126	
		Canada	n.a.				n.a.				n.a.				46*	132	66	
		Switzerland	19	132	113													
		Total	705	2,506	1,801	.73	636	2,294	1,650	.72	863	2,047	1,984	.69	2,243	4,107	1,944	.46
674.1	Iron steel heavy plates, etc.	U.S.	n.a.	n.a.	n.a.		3,000	2,690	-110		21,007	5,999	-15,008		15,358	15,611	-255	
		France	n.a.	n.a.	n.a.		200	121**	-07		726	196	-530		774	341**	-701	
		Germany	n.a.	n.a.	n.a.		528	160	-368		1,909	256	-348		1,209	139	-705	
		U.K.	n.a.	n.a.	n.a.		657	354	-303		3,300	502	-1,007		250	-1,935		
		Japan	n.a.	n.a.	n.a.		3,542	400	-3,136		n.a.				2,105	86**	-1,22	
		Australia					1,147		-1,006						103			
		Total	n.a.	n.a.	n.a.	.73	9,002	3,994	-5,008	-1.27	27,221	7,455	-19,766	-2.65	20,020	16,442	-4,376	-.27

(cont'd.)

SITC Code No.	Commodity	Country of Export	1965 M^P	1965 X^F	1965 D	1965 R	1966 M^P	1966 X^F	1966 D	1966 R	1967 M^P	1967 X^F	1967 D	1967 R	1968 M^P	1968 X^F	1968 D	1968 R
674.2	Iron steel medium plates	U.K.	n.a.	n.a.	n.a.		373	210**	-163		275	332	57		n.a.	n.a.	n.a.	
		Japan	n.a.	n.a.	n.a.		769	379	-410		655	275**	-420		n.a.	n.a.	n.a.	
		Germany	n.a.	n.a.	n.a.		216	155	-61		n.a.	--	--		n.a.	n.a.	n.a.	
		Belgium	n.a.	n.a.	n.a.		164	111	-53		n.a.	--	--		n.a.	n.a.	n.a.	
		France	n.a.	n.a.	n.a.		209	110**	179		970	607	-363		n.a.	n.a.	n.a.	
		Total	n.a.	n.a.	n.a.		1,031	965	-066	-.90				-.60				.74
732.3	Lorries and trucks	U.S.	n.a.	n.a.	n.a.		2,076	4,091	2,015		771	1,704	2,933		1,353	1,648	295	
		Italy	n.a.	n.a.	n.a.		105	144	39		715	967	252		93*	1,042	949	
		France	n.a.	n.a.	n.a.		n.a.*	--	--		421	918	497		n.a.	--	--	
		Germany	n.a.	n.a.	n.a.		63*	2,019	2,756		0*	106	98		n.a.	--	--	
		U.K.	n.a.	n.a.	n.a.		510	3,645	3,135		276	3,267	2,991		530	2,719	2,189	
		Japan	n.a.	n.a.	n.a.		n.a.	--	--		39*	2,133	2,094		230	3,170	2,940	
		Total	n.a.	n.a.	n.a.		3,554	11,499	7,945	.69	2,230	11,095	8,865	.80	2,206	8,579	6,371	.00
733	Road vehicles, non-motor	U.S.	169	120	-49		179	228	49		n.a.	152	-21		n.a.	--	--	
		Germany	202	132	-70		137	160	23		170	2,561	2,111		158	161	23	
		U.K.	500	606	18		230	403	165		250	207	-267		410	447	29	
		Italy	924	1,027	103		276	460	152		554	451	-433		n.a.	--	--	
		Japan	n.a.	--	--		n.a.	--	--		10*	--	--		576	628	52	
		Total	1,603	1,885	2	.00	830	1,255	429	.34	995	3,451	2,456	.72				.00
33	Petroleum and products	U.S.	7,712	6,651	-1,061		6,115	4,244	-1,871		4,758	3,004	-1,754		3,705	3,507	-198	
		Germany	166	241	57		128	155	27		161	220	59		234	255	21	
		Italy	5,797	8,137	2,340		15,545	9,451	-6,094		5,904	3,862	-2,122		709	523	-186	
		U.K.	458	490	32		1,775	1,066	-709		705	526	-179		1,074	940	-134	
		Japan	949	620	-329		213	207	-6		n.a.	--	--		n.a.	--	--	
		Total	15,102	16,141	1,039	.06	23,776	15,123	-8,653	-.57	11,600	7,612	-3,996	.52	5,722	5,225	-497	-.10
864	Watches and clocks	Switzerland	831	866	35		396	456	60		206	447	161		396	536	140	
		Japan	312	325	13		299	271	28		277	276	-1		309	337	28	
		Total	1,143	1,191	40	.53	695	727	32	.04	563	723	160	.22	705	873	168	.19
821	Furniture	U.S. (Total)	143	303	160	.53	320	290	-22	-.07	159	194	35	.18	121	128	7	.05
891	Sound recorders producers	Germany	n.a.	n.a.	n.a.		103	130	27		107	108	1		n.a.	n.a.	n.a.	
		Japan	n.a.	n.a.	n.a.		n.a.	--	--		171	272	101		n.a.	n.a.	n.a.	
		Total	n.a.	n.a.	n.a.	.00	103	130	27	.21	278	380	102	.27	n.a.	n.a.	n.a.	
599	Chemicals n.e.s. (pesticides, etc.)	U.S.	6,517	3,140	-3,377		8,194	5,620	-2,574		10,800	3,188	-7,612		8,236	8,057	621	
		Germany	3,418	2,549	-869		2,196	1,723	-473		2,053	1,160	-503		3,103	2,142	-961	
		U.K.	2,572	1,017	-755		1,201	926	-275		2,277	1,133	-1,149		2,277	1,475	-802	
		Switzerland	1,961	4,273	2,312		7,346	5,920	-1,426		334	1,236	1,017		334	2,027	1,693	
		Japan	756	532	-224		n.a.	--	--		1,460	351	-1,154		372	362	10	
		Total	15,224	12,311	-2,913	-.24	19,157	14,617	-4,540	-.31	20,066	9,050	-11,635	-1.30	14,322	14,683	561	.04

Source: U.N. Commodity Trade Statistics, 1965, 1966, 1967, 1968.

APPENDIX A II

Sub-division of Selected Commodities Representing Their
Rate of Import Duty as in Table IV

1	2[b]	3[b]	4[a]	5[b]
Commodity	SITC Code No.	Tariff rate for the commodity represented by its SITC sub-division Code No.	Pakistan Customs Tariff Code No.	Ratio of import values in sub-division of column 3 to total imports of the commodity (1968)
Meat and Preparations	01	01	02	1
Cereal Preparations	048	048.8	19.03	.77
Fruit and Vegetables	05	051	08	.89
Sugar and Preps Cereal	06	061.2	17.01	.95
Tea and Mate	074	074.1	09.02	1
Unmanufactured Tobacco	121	121	24.01	1
Pulp and Waste Paper	251	251.2	47.01	.58
Wool and Animal Hair	262	262.8	53.05	.77
Iron and Steel Scrap	282	282	73.03	1
Animal, Vegetable Oil, Fat	4	421	15.07	.77
Chemical Elements Compound	51	512 + 513 + 514	28,29	.99
Medicinal Products	541	541.7	30	.70
Fertilizers Manufactured	561	561.1 + 651.2	31	.83
Plastic Materials	581	581.9	39.04	.77
Rubber Tyres, Tubes	629.1	629.1	40.11	1
Hygenic Unhardened Rubber	629.3	629.3	40.12	1
Pig Iron	671	671	73.01	1
Iron, Steel Primary Form	672	672.5	73.07	.94

1	2[b]	3[b]	4[a]	5[b]
Commodity	SITC Code No.	Tariff rate for the commodity represented by its SITC sub-division Code No.	Pakistan Customs Tariff Code No.	Ratio of imports value in sub-division of column 3 to total imports of the commodity (1968)
Iron Steel, Hoop Strip	675	675	73.12	1
Iron Steel Wire, excl. Rod	677	677	73.14	1
Power Machinery, Non-Electric	711	711.1 + 711.5 + 711.6	84.01 to 84.08	.74
Agricultural Machinery	712	712.5	87.01	.86
Metal Working Machinery	715	715.1	84.45	.70
Switchgears	722.2	722.2	85.19	1
Telecommunication Equipment	724	724.1 + 724.9	85.15	.91
Batteries and Accumulators	729.1	729.1	85.03	1
Electric Meas., Cont. Equip.	729.5	729.5	90.26	1
Iron Steel, Heavy Plates etc.	674.1	674.1	73.09	1
Iron Steel, Medium Plates	674.2	674.2	73.13	1
Lorries and Trucks	732.3	732.3	87.02c	1
Road Vehicle Non-Motor	733	733.1	87.10	.71
Petroleum and Products	33	331	27.10	.63
Watches and Clocks	864	864.1 + 864.2	91	1
Furniture	821	821	94.03	1
Sound Recorders, Producers	891	891.1	92.11	.74
Chemical Nes. (Pesticides, etc.)	599	599.2 + 599.9	38.11, 38.19	.85

Source:
a. Pakistan Customs Tariff 1960, 1963, 1966, 1968.
b. U.N. Commodity Trade Statistics (1968).

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