Secretariat Note on the Effects of Differential Tariffs

1. It is generally recognized that the effective rate of protection yielded by a tariff will exceed the nominal tariff rate if the inputs into the production process are taxed at lower rates than the final product. In this note the margins of effective protection are estimated for two products of special export interest to Nigeria - groundnuts and cocoa.

2. The value added at any given stage of processing equals the gross value of output at this stage minus the value of inputs purchased from other firms. In a simple processing of a given raw material \( P_1 \), value added in processing would equal the product value at stage 2 minus the input, or

\[
V = P_2 - P_1
\]

3. If the commodity in question and its components are traded internationally, their values in any producing country will be influenced by the relevant import duties. Using \( P' \), \( P'' \) for the world market values (including transport cost) and \( t_1 \), \( t_2 \) for the tariff rates, value added in processing can be expressed as:

\[
V = P' \cdot (1+t_2) - P'' \cdot (1+t_1)
\]

The effective protection afforded to the processing operation, \( X \), can be measured by the excess, which it makes possible, of internal value added over the corresponding external value. It can thus be obtained by the following formula:

\[
X = \frac{P' \cdot (1+t_2) - P'' \cdot (1+t_1)}{P'_2 - P'_1} - 1.00
\]

4. It is easy to see that if \( t_2 = t_1 \), \( X \), the implied rate of protection of the value added, must be equal to each of the two nominal tariff rates. Assume the world market value of the processed product to be 100, the value of the raw material 80 and the import duty applicable to both at 10 per cent ad valorem. Then

\[
X = \frac{110 - 88}{20} - 1.00 = 0.10
\]

5. On the other hand, if \( t_2 \) exceeds \( t_1 \), the effective protection will exceed \( t_2 \), the nominal rate on the processed product. If the value added at stage 2 is only a small fraction of the gross value, the margin of effective protection may easily reach 100 per cent and even more, as will be shown on the two examples below.
6. In the reverse case, should \( t_1 \) exceed \( t_2 \), the tariff structure would be penalizing the domestic producers of the commodity in question to the advantage of foreign exporters. Such cases are rare, however, as most tariffs are graduated upwards with the degree of processing.

**Groundnuts and processed products**

7. It should be noted at the outset that the calculations presented here can be only roughly indicative of the true magnitudes. The value added in processing cannot be ascertained precisely as the price of the raw material tends to fluctuate somewhat more than the prices of processed products, transport costs vary according to the mode of transport and the price indices available do not always include products of identical specification (especially as regards oil content). A calculation presented in the Nigerian Development Plan Study, based on a three-year average of unit import values c.i.f. London\(^1\) and the average oil content of 45 per cent indicated that processing added only 3 per cent to the value of a ton of Nigerian groundnuts. This is a strikingly low ratio. An extensive study of the available literature and interviews with experts from the industry confirmed that, in the case of groundnuts, the value added in processing only seldom exceeds 10 per cent (and then does not reflect the cost of processing alone but contains commercial profit) and generally falls between 5 and 10 per cent.

8. The calculation was first performed on the price data described above; alternatively, it was assumed that the value added in processing is 10 per cent and distributed between oil and cake in the same way as before. Thus, in terms of import unit values, one ton of groundnuts, valued at £63.7, yields 0.45 tons of oil valued at £46.26 (£102.8 per ton) and 0.55 tons of cake valued at £19.25 (£35 per ton). Subsequently the values of a ton of groundnuts and of its processed equivalent were computed in terms of domestic values, taking account of the existing tariffs, and the value added domestically compared with the value added in processing abroad, as implied in the import unit values. The excess of the former over the latter is fully due to the import duties, and the percentage rate of implied, or effective, protection was obtained as a ratio of the domestic to foreign value added.

9. The results of the calculations are presented in the table below. The first (smaller) figure given for effective protection of the processing industry in the raw material importing market refers to the hypothetical case where value added by processing represents 15 per cent of the raw material value; the second (higher) figure results from calculations on actual import unit values of both raw and processed products.

\(^1\)Groundnut oil £102.8; groundnut cake £35.0; groundnuts shelled £63.7 per ton.
10. Since the United States is itself a large producer of the raw material, the negative differential of its tariffs has little influence on trade flows. The duty on oil is high enough to preclude importation while the level of production costs necessitating a 41 per cent duty makes commercial exportation of nuts equally impossible. There might be, however, a possibility of profitably importing groundnut cake into the United States.

11. The analysis presented here has some additional interesting implications. It shows also that a uniform nominal tariff rate on all edible vegetable oils will have different effective incidence depending on the processing cost of each kind of oil. Should the nominal tariff rate be, say 10 per cent, its effective incidence would be considerably less on cottonseed oil, where the value added by processing is relatively high\(^1\), than on groundnut oil which is processed at relatively low cost.

Cocoa and processed products

This example again considers only the first stage of processing in which cocoa beans are transformed into cocoa butter and powder. In terms of weight, one ton of beans yields, on the average, 0.32 tons of butter, 0.48 tons of powder and 0.20 tons of waste. For valuation, the average 1962-63 unit import values, c.i.f. United Kingdom ports, have been chosen; the residual waste has been arbitrarily valued at 0.10 per cent of raw material value. Thus, the processing of 1 ton of cocoa beans worth £173.5 in the reference period yielded £134.56 worth of butter (at £420.5 per ton), £60.43 worth of powder (at £125.9 per ton), and £3.4 worth of residual (at £17.3 per ton). The value added in processing, as reflected in these import values, amounts to 14.4 per cent of the gross processed product.

These reference values have been in each case increased by the amount of duty collected on each product, and the resulting internal value added related to the corresponding external value. The results of the calculation are presented below:

\(^1\)In the United States it averages between two-fifths and one-third of the gross value after processing.

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<table>
<thead>
<tr>
<th>Product</th>
<th>MFN Effective Protection</th>
<th>CET Effective Protection</th>
<th>MFN Effective Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundnuts, shelled</td>
<td>10%</td>
<td>Free</td>
<td>(41%)(^a)</td>
</tr>
<tr>
<td>Groundnut oil, unrefined</td>
<td>15%</td>
<td>10%</td>
<td>(30%)</td>
</tr>
<tr>
<td>Groundnut cake</td>
<td>10% (49%-138%)</td>
<td>Free</td>
<td>77%-256%</td>
</tr>
</tbody>
</table>

\(^a\)Ad valorem equivalents.
<table>
<thead>
<tr>
<th>Product</th>
<th>United Kingdom</th>
<th></th>
<th>Common Market</th>
<th></th>
<th>United States</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MFN</td>
<td>Effective Protection</td>
<td>CET</td>
<td>Effective Protection</td>
<td>MFN</td>
<td>Effective Protection</td>
</tr>
<tr>
<td>Raw cocoa beans</td>
<td>(1.5%)</td>
<td>5.4%</td>
<td>(0.5%)</td>
<td>20.0%</td>
<td>Free</td>
<td></td>
</tr>
<tr>
<td>Cocoa butter</td>
<td>(0.5%)</td>
<td>-13%</td>
<td>(2.0%)</td>
<td>136%</td>
<td>6.5%</td>
<td>50%</td>
</tr>
<tr>
<td>Cocoa powder unsweetened</td>
<td>(2.0%)</td>
<td>27.0%</td>
<td>(6%)</td>
<td></td>
<td>(6%)</td>
<td></td>
</tr>
</tbody>
</table>

( ) denotes ad valorem equivalents.

In the case of the United Kingdom, the negative differential has little influence on trade flows as raw material comes from preferred countries which until recently had no processing facilities whereas processed products have to enter under the general tariff rates.