to the search for a stimulus to economic growth after the ‘easy’ stages of ISI were completed, and finally to the overriding necessity to ease pressures on the balance of payments. The sympathetic hearing from the Board of Trade and Industries received by individual companies to pleas for protection created a tariff structure which did not necessarily reflect any particular policy.

Finally, it should be noted that the reforms that have taken place in South Africa have not been part of a general and formal structural adjustment programme, and only very recently have the requirements of an external agency (the WTO) begun to drive trade reform. Changes have occurred in response to problems which have arisen in the economy. This has several implications. Firstly, the fact that the liberalisation measures are designed domestically, with the aim of addressing particular problems, means that the government is committed to each reform. Moreover, the government has generally achieved consensus through consultation with the business sector. Consequently there is domestically no significant credibility problem. Even with respect to a reduction in the overall level of protection, industrialists support the government’s initiatives, although specific programmes have been vigorously criticised. The BTI has shown a willingness to resist lobbying pressures from the private sector over the last seven years. Secondly, there is no ultimate free-trade goal towards which the government is moving. In fact, it has specifically distanced itself from such a position. Trade policy is evolving in response to the perceived needs of the economy, and, in a limited measure, to pressure from the GATT. The South African government has usually moved at its own pace in implementing recommendations, even those of commissions appointed by the government. It appears to be continuing that tradition with respect to its implementation of the GATT agreement. The commitment to the GATT has the added advantage of reducing the possibility of a reversal of policy, thereby offering greater credibility to investors, both domestic and foreign.

3. The Impact of Trade Liberalisation

Protection against international trade changes the structure of relative prices in an economy, affecting the incentives to produce and consume individual products. In the previous section we described the evolution of trade policy in South Africa, and showed that there had been a sustained but gradual effort to reduce the anti-export bias of trade policy, by subsidising exports and making import protection more transparent (though without reducing the effective rate of import protection to any significant degree). In this section we investigate the impact of trade liberalisation on relative prices by using three techniques: (a) incidence analysis; (b) regression analysis that attempts to correct for various possible influences other than trade policy on relative prices; and (c) Computable General Equilibrium modelling, which we apply to the current programme of tariff reductions. The results of all three analyses are consistent, in the sense that the impact of trade policy is rather small in every case.
3.1 Incidence Analysis

Different trade policies may have differing effects on the incentives to produce importables and exportables in an economy. Incidence analysis is one method of estimating the overall effect on incentives of various trade policy measures.

The economy is assumed to consist of three sectors, exportables, importables and non-tradables. The extent to which a tariff changes the relative prices of importables to exportables and non-tradables is an indication of the real protection given to importables and a measure of the extent to which the tariff is shifted onto exportables and non-tradables (Dornbusch, 1974). Import protection has the effect of raising the price of importables relative to the price of exportables. The price of exportables is usually determined on world markets and the tariff protection raises the price of importables. This increase in the relative price of importables is termed ‘anti-export bias’.

In addition to increasing the relative price of importables, import protection also increases the price of non-tradables. When the price of importables increases, consumers switch expenditure towards non-tradables, thereby increasing their prices. At the same time producers are encouraged to produce fewer non-tradables when the price of importables increases. Both the demand and the supply responses in the market for non-tradables to the increase in the price of importables create an excess demand for non-tradables and increase their prices.

The increase in the price of non-tradables also reduces the price of exportables relative to non-tradables making it relatively less attractive for the production of exportables. Similarly, producers of importables find that their incentive to produce is reduced as the increase in the price of non-tradables reduces the price of importables relative to non-tradables. Therefore, the extent to which exportables bear the burden of protection is a function of the rise in the price of non-tradables.

The impact of protection, or the incidence of protection, is measured in the following way:

\[ \hat{P}_n = \omega \hat{P}_m + (1 - \omega) \hat{P}_x \]

\[ \hat{P}_x - \hat{P}_n = \omega (\hat{P}_m - \hat{P}_x) \]

(1)

\( \hat{P}_n \) is the proportionate change in the price of non-tradables; \( \hat{P}_m \) is the proportionate change in the price of exportables. The shift parameter (\( \omega \)) is a measure of the response in the price of non-tradables relative to exportables to changes in the price of importables relative to exportables.

\[ t^* = \Delta \left( \frac{P_m}{P_x} \right) \]

(2)

and

\[ s^* = \Delta \left( \frac{P_n}{P_x} \right) \]

(3)

15
If we assume that free trade prices are normalised to unity then *ad valorem* tariffs on imports, and subsidies to exporters, raise the denominators in equations 2 and 3. Whether the true protection and subsidy rates diverge from their nominal rates depends on how the price of non-tradables changes. If \( d \) is the proportionate change in the price of non-tradables, then equations 2 and 3 become

\[
tr^* = \frac{(1 + t)}{(1 + d)} - 1 = \frac{(t - d)}{(1 + d)}
\]

and

\[
s^* = \frac{(s - d)}{(1 + d)}
\]

The proportionate change in the price of non-tradables is as follows:

\[
\hat{p}_n = \omega \hat{p}_m + (1 - \omega) \hat{p}_n = \omega t + (1 - \omega) s
\]

where \( \omega \) is the shift parameter which is an index of the substitutability between non-tradables and importables in production and demand (Greenaway and Milner, 1993). It can also be shown that \( \omega \) lies between one and zero.

3.1.2 Estimation

Equation 1 is estimated in double logarithmic form using price data such that

\[
\ln(PNPX) = b_0 + b_1 \ln(PIMX + e)
\]

PNPX is the price of non-tradables relative to exportables and PIMX is the price of importables relative to exportables.

The price index for non-tradables is computed through the use of quarterly sectoral GDP data which is available in nominal and constant price terms (Holden, 1988). The prices of exportables and importables were taken from the export and import price indices published in the Reserve Bank Quarterly Bulletin of Statistics.

The incidence parameter is calculated for two periods on quarterly data. The first estimate is made by Holden in 1990 for data from 1974 to the first quarter of 1987. The second estimate is made using the rebased national accounts data and covers the period 1985 to 1994. The incidence parameter is estimated for exports which include and exclude gold exports.
Table 3.1 Estimation of the Incidence Parameter*

<table>
<thead>
<tr>
<th>Equation</th>
<th>Independent variable</th>
<th>Coefficient period 1</th>
<th>Coefficient period 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports including gold</td>
<td>lnPIMX</td>
<td>0.707** (6.818)</td>
<td>0.801** (6.07)</td>
</tr>
<tr>
<td>Exports excluding gold</td>
<td>lnPIMX</td>
<td>0.341** (3.004)</td>
<td>0.756** (13.38)</td>
</tr>
</tbody>
</table>

* Cochrane Orcutt transformation used  
** Significant at the 1% level  
t-statistics are in parentheses

In both periods the incidence or shift parameter $\omega$ is larger when the price of gold is included in the export price index. During the earlier period when gold exports are excluded the incidence parameter is estimated at 0.341. When gold exports are included the parameter estimate rises to 0.707. In this period manufactured exportables did not benefit from the General Export Incentive Scheme. Estimates of the incidence parameter for the later period are 0.757 and 0.801 excluding and including gold respectively.

These results indicate that when the price of gold is included in the price of exports, a substantial proportion of the protection given to importables is shifted in the form of an implicit export tax onto exportables. In this case exportables and non-tradables are not close substitutes. On the other hand, when gold exports are excluded from the export price index in both periods, estimates of the incidence parameter are lower, demonstrating greater substitutability between manufactured exportables and non-tradables. This result is not surprising as we would expect the factors of production to be less sector-specific in non-gold exports than in gold production.

For both non-gold exports and all exports the incidence parameter is higher during the later period. During this period the South African economy experienced an ongoing recession and limited the movement of the factors of production between the traded and non-traded sectors of the economy. This is then reflected in a rise in the estimate of the incidence parameter for non-gold exports and all exportables in the later period.

The true tariffs and true subsidy rates for non-gold estimates of the incidence parameter are calculated for both periods assuming average rates of nominal tariffs and export subsidies.

True protection in the period 1974 to 1987 is calculated at 14% as compared with the average rate of nominal protection of 22% in this period (GATT Trade Review, 1994). It is assumed that exports did not receive any meaningful subsidies in this period. The bias against exports is accordingly a high of -6%. During the later period despite the introduction of the General
Export Incentive Scheme and lower average tariff rates the bias against exports is only marginally reduced to -5%. True protection is also low at 1.7%.

<table>
<thead>
<tr>
<th>Time period</th>
<th>Incidence parameter</th>
<th>d</th>
<th>t</th>
<th>s</th>
<th>t*</th>
<th>s*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974–1987</td>
<td>0.341</td>
<td>0.07</td>
<td>22</td>
<td>0</td>
<td>14</td>
<td>-6</td>
</tr>
<tr>
<td>1985–1994</td>
<td>0.756</td>
<td>0.15</td>
<td>17</td>
<td>9</td>
<td>1.7</td>
<td>-5</td>
</tr>
</tbody>
</table>

### 3.2 Regression Analysis

Trade liberalisation is expected to influence the relative price of traded goods: if restrictions on imports are reduced, they should be cheaper relative to domestic output. However, at an aggregate level, there may be additional influences on relative price because of the particular composition of imports. If, for example, imports are biased towards primary commodities, then commodity prices will influence the import price index relative to the consumer price index. As we show below, the movements in both import and non-gold export prices show some correlation with an index of primary commodity prices.

It is also possible that the effects of trade liberalisation are seen in quantities as well as prices. One reason why this may occur is because the change in policy causes new goods to be exported or imported. These goods will not appear in the pre-trade liberalisation export and import price indices, and consequently the shift in the incentive to trade is likely to be understated. Changes in quantities may, however, be an index of the lack of credibility of the liberalisation, as importers seek to stock up before an anticipated reversal of the policy. However, we do not believe that credibility problems are significant in South Africa, since policy has shifted rather slowly and cautiously.

In the South African case, there is a major issue of the timing of trade liberalisation. There has been a significant shift of policy over a long period of time, starting in the early 1970s, and with some retreats (e.g. the imposition of import surcharges in 1985). Over this period, there have been some sharp swings in the real exchange rate, whose impact can be seen in the trade figures. From an econometric point of view, this means that one cannot use a simple dummy variable to capture the change in policy, since the shift in stance was drawn out over such a long period. The approach adopted here is to try to model trade data using a variety of explanatory variables, and to use a simple time trend as a possible proxy for policy shifts. This procedure has the disadvantage that a significant coefficient of the time trend is susceptible to a variety of other interpretations. In general, any omitted variable may be responsible for it. Consequently, any conclusions that are drawn depend heavily on the quality of the model used in the estimation. This having been said, however, the modelling process does yield some useful insights.

#### 3.2.1 Relative price effects

Figures 3.1 to 3.3 present some data on relative prices and the real exchange rate from 1978 to 1992. The starting date is 1978 because the real effective exchange rate index was not
calculated before that date. The graphs are constructed in such a way that there is expected to be a positive correlation between the variables. Thus the relative price of imports is expressed as the ratio of the consumer price index to the import price index (all variables are in logs).

Figure 3.1 looks at the relative price of total imports. This appears to be considerably lower (relative to the CPI) in 1992 (compared to 1978) than one would expect on the basis of the real exchange rate. In particular, import prices have fallen relatively by some way since 1987, whilst the real exchange rate has hardly changed. In the early part of the period, the most obvious feature is the rise in import prices in 1979-80, which may reflect oil price effects (though in this case one would expect a sharp reversal in 1986, when oil prices collapsed).

Fig. 3.1 Relative import prices and the real exchange rate

![Graph showing relative import prices and the real exchange rate from 1978 to 1992.]

Figure 3.2 examines the same issue but using data on manufacturing prices only. Relative to an index of the prices of manufactured goods produced and consumed in South Africa, the import price index of manufactures moves fairly closely with the real exchange rate, but is less volatile. Although there is a suggestion of a fall in relative import prices in recent years, this appears to be an accurate reflection of movements in the real exchange rate.
Figure 3.3 compares the relative price of non-gold exports with the real exchange rate. Non-gold export prices appear to have fallen quite considerably in relative terms since 1978 (this is also true if producer prices of manufactures are used as deflator instead of the CPI), and there is clearly some correlation with the real exchange rate.