CREDIT Research Paper

No. 06/11

Trade Policy and Transport Costs in Kenya

by

Jane Kiringai

Abstract

Recent studies on trade policy for low-income countries have established that high transport costs associated with poor quality infrastructure in countries such as Kenya represent a barrier to trade and an additional source of protection to domestic producers of import competing goods. This study reports results for Kenya on protection rates from tariffs and transport costs. Although Kenya reduced tariffs during the 1990s, protection increased for agriculture, manufactured foods, wood products and clothing. Two sectors experienced declines in protection (raw textiles, fishing and forestry) and chemicals moved from positive to negative protection. Effective protection due to transport costs was equivalent to 50% in the early 1990s but fell to 20% by 2003. As the new EAC Customs Union implies a reduction in tariffs, overall the level of protection will fall on average to below ten per cent.

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Outline

The Authors

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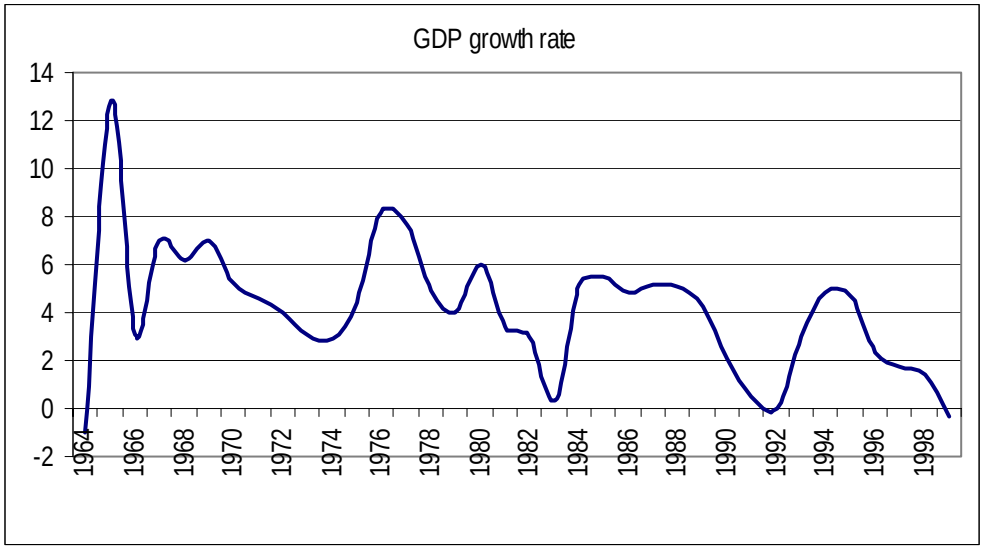
1 Introduction

Kenya achieved an impressive growth record in the first decade after independence in the mid to late 1960s. However the growth momentum was not sustained in the 1970s. ROK (1975) attributed this slack to three factors, all external sector related: a price squeeze—in the international markets import prices were rising faster than export prices; a commodity squeeze—there was a rising trend in imports; and a credit squeeze—the difficulty of borrowing more from abroad. The only solution identified was boosting export performance.

Chart 1 Real GDP Growth Rates 1963-2000



Source: Kenya Analytical Data Compendium (2002)

The trend in Chart 1 indicates a steady decline in GDP growth from 1968 to 1974. The poor performance in 1974 is attributed to the oil shock -- the price of oil increased by 398%. There was a significant improvement in economic growth between 1976 –77, the coffee boom period recording a growth of 8.3%. However, after the boom an expansionary fiscal policy was adopted which complicated macroeconomic management in the medium term. This episode was followed by another sluggish growth performance between 1984-86 attributed to *inter alia* balance of payments problems and droughts. During the period 1978 –1986, the policy response to balance of payments problems was increased controls - items were shifted

to more restrictive import control schedules - followed by relaxation once the situation improved, resulting in a complex structure of protection.

Trade reforms in Kenya started in the early 1990s. The outward orientation strategy was characterized by trade and commercial policy reforms intended to introduce efficiency gains in the economy by eliminating distortions and 'getting the prices right' through a greater reliance on markets. Quantitative restrictions were replaced with tariffs; average tariffs were lowered and made more uniform. Trade policy reforms were complemented by liberalization of the exchange rate and additional export incentives also aimed at increasing external competitiveness.

A decade later trade liberalization has not delivered the promise of high real growth rates, export performance has been sluggish, economic growth has witnessed a consistently declining trend since 1996. Population growth rates have been well above the growth rate of productive output, resulting in rising poverty and unemployment. During the recession period, population growth averaged 2.8% while economic growth averaged about 2.4%, the corollary is a gradual decline in incomes per capita. In terms of contribution to national output, agriculture maintains the lead accounting for 24% of GDP, the manufacturing sector has not matured to emerge as the principle export sector as was initially envisaged under the infant industry thesis.

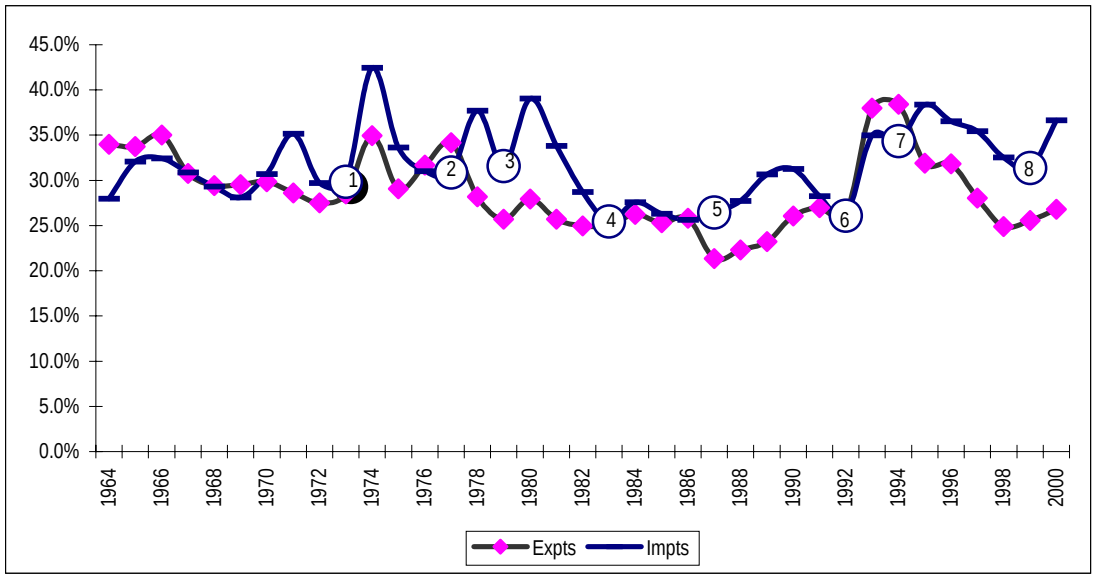
This study seeks to analyse the post liberalisation structure of protection in Kenya, from 1990 to 2000. Effective Protection Coefficients (EPCs) will be computed at industry/activity level and ranked to determine the direction of resource pulls in production. The EPCs will be used to compare the rates of protection across industries and across time to uncover the impact of trade liberalisation on the structure of protection in Kenya. Further, the study will analyse the structure of protection arising from transport costs as a natural barrier to trade.

The rest of the paper is organised as follows; section two is background covering trade performance and policy regimes in Kenya. Effective rates of protection from tariffs are computed and discussed in section three. Protection and taxation arising from international freight costs and domestic transport costs are covered in section four. The summary and conclusions are covered in section five.

2 The Trade Regimes in Kenya

The poor performance of the external sector has been the motivation behind several liberalisation episodes in Kenya, see Reinikka (1994), Maxwell Stamp Associates (1989), Glenday and Ndii (2003). Though there is no consensus on the exact timing of the liberalisation episodes, the periodic increase in imports of goods and services (numbered 1-8 in Chart 2) coincide with the suggested episodes. Reinikka (1994), for instance, identifies five episodes. The first was in 1973 following the oil shock, a 398% increase in the price of oil leaving the country in a severe foreign exchange crunch, but was not sustainable - exchange controls had to be tightened to conserve foreign exchange, reversing the measures instituted. The second episode followed the coffee boom 1976-77; the higher earnings from coffee relaxed the foreign exchange constraint, permitting a relaxation of import restrictions.

Chart 2 Foreign Trade as % of GDP



Source: KIPPRA Data Compendium

The period between the first and second liberalisation episodes was characterized by persistent balance of payments deficits, largely due to the massive increase in the cost of oil imports. By 1979, 120% of coffee export earnings were required to pay for oil imports, (ROK 1980). During the same period the plan to achieve an 8% increase in the growth of exports was not realizable, and there was a fall in the price of

agricultural commodities in the international market. Furthermore, as a result of the break up of the East African Community (EAC) in 1977, Kenya lost the Tanzanian market which was an important destination for her exports.

The third liberalisation episode was motivated by the need to correct macroeconomic imbalances, the aftermath of the expansionary fiscal policy, which followed the coffee boom. Between the three liberalisation episodes, the BOP deficit increased and each crisis would be addressed through *ad hoc* quantitive restrictions in addition to the existing tariffs. Export performance deteriorated and the need to remove the anti-export bias in the trade policy regime became the overriding concern which was addressed through the import substitution strategy.

The stated policies under the IS strategy were to contain the growth of imports to less than 2% on an annual basis, down from 7.3%; increase the growth of exports to 8% per annum and stimulate domestic production in substitution for imports and to support exports. Imports were to be constrained through higher taxes and quantitative restrictions, whilst an export subsidy of 10% on manufactured goods would promote exports. A foreign exchange allocation committee was constituted and an export-import licensing office to manage the controls aimed at increasing exports. A complex structure of protection emerged and the quantitative restrictions created a fertile environment for rent-seeking activities.

Though the controls reduced the volume and value of imports from 39% of GDP in 1980 to 28% in 1984, reducing the deficit, trade performance deteriorated. Import controls constrained the growth of manufacturing and exports remained around 25% of GDP. When the IS strategy was adopted during the second half of 1980s, GDP growth ranged between 4-6% but the strategy was unsustainable. The growth of manufacturing was based on domestic demand and the scope for growth under IS was limited. Following the failure of IS strategy, Kenya started implementing a gradual liberalisation programme in 1986, with specific focus of eliminating anti export bias.

The tariff rationalisation programme started in 1986 with policy pronouncements in ROK (1986) and the National Development Plans. Trade policy reforms comprised of three components: rationalize the tariff code, reduce the average tariff rates and

reduce the number of tariff bands (Pritchett and Sethi, 1994). Kenya has been undertaking trade reforms since the early 1990s, as part of World Bank conditionality and in preferential trade arrangements. Starting from 1990 there has been a gradual reduction in both tariff rates, especially on imported intermediate inputs, and tariff bands. The magnitude of reduction is constrained by revenue loss implications and the gradual pace allows for shifting to other sources of revenue.

Duty rates on imported raw materials and spare parts were targeted for reduction so as to reduce the anti-export bias and improve the country's competitiveness. Duty rates for this category of goods ranged between 10% and 100% in 1990 — the first steps in the liberalisation process were to reduce tariffs on intermediate inputs by an average of 5%, while increasing duty on finished products by a maximum of 35%. Duty on capital equipment and parts has also been targeted for reduction in the liberalisation process, and items taxed at 3% and 5% were zero rated by 2003. A similar reduction was applied to raw materials that are not produced locally. The other liberalisation measure has been the reduction in the number of tariff bands. Starting from 1989, the number of tariff categories was reduced from 25 to 17; in 1990 another five categories were eliminated, reducing the bands to 12, and to 9 by 1993. Currently there are five tariff bands: free, 5%, 15%, 25% and 35%.

In the liberalisation process, 1993 presented specific challenges, and there was a 25% temporary increase in duty rates. This was occasioned by the high inflationary pressure in the domestic markets and the mopping up exercise significantly increased domestic interest payments, additional revenues had to be mobilised through tariff revenue to cover the additional expenditure. With the exception of specific agricultural commodities, notably sugar, the tariff liberalisation has resulted in a significant reduction in tariff barriers. However, there have been notable policy reversals; duty on fabrics was raised from 25% to 35%, to protect local producers, duty on locally available food stuffs was raised to 35% while the duty on sugar increased to 100%. The duty rates applied on wheat and sugar imports from COMESA caused a trade dispute with trading partners. The IMF rates the Kenyan trade regime at 6 on a scale of 1 to 10 (most restrictive), a moderately restrictive trade policy (IMF 2003).

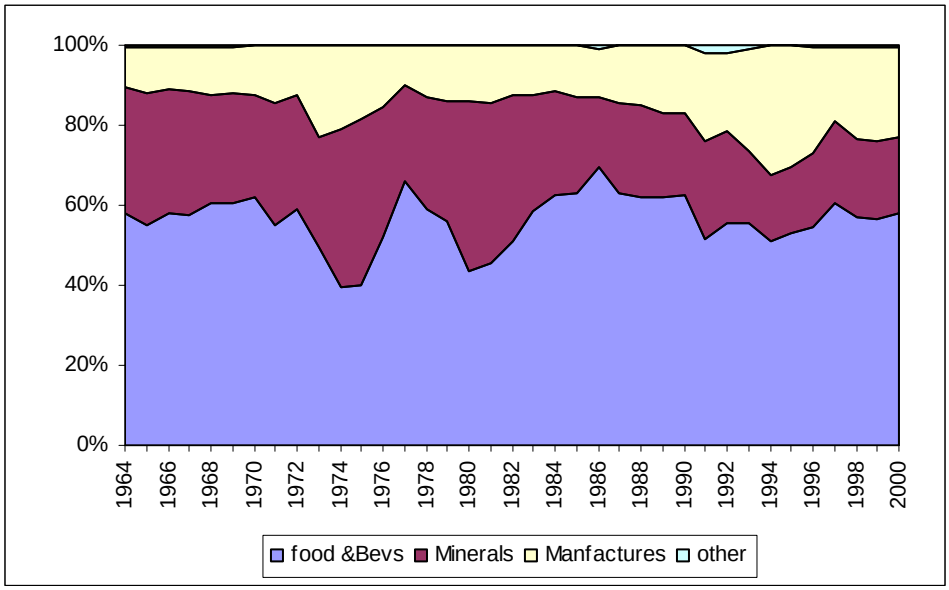
Export Performance

A review of export performance indicates that there are only two episodes when Kenya recorded a balance of payments surplus (Chart 2). The first was during the coffee boom in 1977, the second in 1993-94 due to a combination of a weak shilling, abolition of exchange controls and a fall in the real wage (Glenday and Ndii 2000). The high level of export growth was not sustained and explicit measures were taken to revamp export performance - duty/VAT remission, an Export Promotion Programmes Office, Export Processing Zones (EPZ) and Manufacturing Under Bond (MUB). In addition, regional trade agreements under COMESA and EAC are also intended to enhance export performance. Other institutional arrangements were also put in place to promote exports. The Export Promotion Council (EPC), was established to identify export opportunities, putting in place a system for overcoming bottlenecks to export growth. The Department of External Trade (DET) developed projects and schemes for export promotion.

According to Glenday and Ndii (2003), exports from MUB/EPZ account for a meagre 1% of total exports. Some of the problems cited for the poor performance of the facilities include the loss of competitiveness arising from an increase in the real wage rate and the exchange rate appreciation. The other constraint to the growth of these schemes is the treatment within a Preferential Trade Area, (PTA); goods from these schemes do not benefit from the preferential tariffs within a trade block, they are taxed at "the rest of the world" rates which is major constraint since COMESA and EAC are the main destinations for Kenyan exports (Glenday and Ryan 2003).

Chart 3 shows that the share of manufacturing in total exports has remained stable, averaging 22% of total exports except in 1993-94 when it increased to 31%. Agriculture continues to be the principle export sector, although agriculture itself has not done well. Indeed, excluding coffee and tea, all other exports as a share of GDP fell from 14% in 1962-71 and 13 % in 1972-80 to 8% in1981-92, but recovered to 13% in 1993-98. By 2002, coffee, tea and horticulture accounted for 53% of total export earnings despite the price decline in the international markets for primary commodities (especially coffee).

Chart 3 Export Shares by Sector 1964--2000



Source: Statistical Abstract Various Issues

Africa continues to be the dominant export market for Kenyan goods, accounting for 49% of total exports in 2002, followed by Western Europe and Asia each accounting for 28% and 15% respectively. Of the 49% share destined for the African market, 55% is accounted for by Uganda and Tanzania. Europe is the major source of imports, accounting for 34% of total imports. Africa, primarily COMESA and EAC, accounts for only 11% of total Kenyan imports. Regional integration could benefit Kenya as it is a major regional supplier, although suggested Common External Tariff (CET) rates are often below current Kenyan tariffs. For the COMESA region, the proposed CET rates are 0, 5, 15 and 25% for capital goods, raw materials, intermediate goods and final goods respectively. Under the EAC Customs Union, goods from Uganda and Tanzania are to be imported into Kenya duty free. The EAC protocol established a three band CET: 0% for raw materials 10 % for intermediate goods and 25% for all finished goods. Once the CET became effective in 2006, Kenya's top rate was reduced from 35 to 25% with only three tariff rates.

3 ANALYTICAL FRAMEWORK AND DATA

The structure of protection can be analysed using partial equilibrium or computable general equilibrium approaches. The former is more common and includes measures such as nominal rate of protection, (NRP), effective rate of protection, (ERP), Trade Restrictiveness Index (TRI) and the index of implied import restrictiveness (IIIR). The ERP represents the percentage increase in value added per unit in economic activity permitted by the tariff structure, holding the exchange rate constant. It can be defined as the ratio of domestic to world value added, relative to a non-interventionist trade regime, (Corden 1966; Anderson 1996; Conway and Bale 1988). While nominal tariffs influence consumer behaviour through the price raising effect, effective protection influences production by pulling resources from non-tradables and sectors with low ERPs to sectors with high ERPs.

Effective protection measures allow for the share of value added in final output, tariffs on intermediate inputs and tariffs on final output, and thus measures the magnitude of implicit taxation of value added (Greenaway and Milner 2003; Anderson 2003). Once the coefficients are computed at industry level, the relative magnitudes indicate the direction of resource pulls (Balassa 1965; Johnson 1965; Corden 1966; Basevi 1966; Greenaway and Milner 1993). Value added for activity *j* in the absence of a tariff can be expressed as

$$p_v = p_j(1 - a_{ij}) \qquad (2)$$

If a tariff t_j is levied on the final output of activity *j* and t_i levied on the intermediate input used in the activity then value added for activity *j* after tariffs is

$$p_v^{'} = p_j[(1 + t_j) - a_{ij}(1 + t_i)] \qquad (3)$$

The change in value added as a result of the intervention is derived by subtracting (2) from (3);

$$e_j = \frac{p_v^{'} - p_v}{p_v} \qquad (3)$$

$$e_j = \frac{\left[(1 + t_j) - a_{ij}(1 + t_i)\right] - p_j(1 - a_{ij})}{p_j(1 - a_{ij})} \qquad (4)$$

which reduces to:

$$e_j = \frac{t_j - a_{ij}t_i}{1 - a_{ij}} \qquad (5)$$

In a case where there are many inputs in the production of j (i = 1,2,…..n), the weighted average of input tariffs is used in place of the single input tariff:

$$e_j = \frac{t_j - \sum_{i}^{n} a_{ij}t_i}{1 - \sum_{1}^{n} a_{ij}} \qquad (6)$$

In the foregoing, P_v is the value added per unit of good j at free trade prices and p_v' is the value added per unit of j at tariff distorted prices, t_j is the nominal tariff levied on industry j, a_{ij} is the share of final value added of j accounted for by input i and t_i is the nominal tariff levied on intermediate input i. The a_{ij} are the technical coefficients derived from the input output table. Non-traded inputs are treated according to the Balassa (1962) method.

$$e_j = \frac{t_j - \sum_{i}^{n} a_{ij}t_i}{1 - \sum_{1}^{n} a_{ij} - \sum_{m} a_{mj}} \qquad [7]$$

where a_{mj} are the technical coefficients for non-traded inputs.

Equation [6] will be used to compute the effective protection coefficients. The data requirements are the a_{ij} (technical coefficients from the Input-Output table), t_i (nominal tariffs on intermediate inputs) and t_j (nominal tariffs on the final product j). We use the implicit tariff, revenue as a proportion of import value before tariffs. Trade data is obtained from the Kenya Revenue Authority at eight digit SITC level and aggregated to three digit level then mapped to the Input-Output (IO) sector level. The t_i are computed by weighting the t_j by the technical coefficients (details in Annexes). The unpublished 1990 IO table is used to compute ERP for the years 1990 and 1994, and updated to 1997 to compute ERPs for the years 1997 and 2000. The coefficients from the table are post-protection technical coefficients, deflated to

generate the adjusted technical coefficients in terms of free trade (border) prices following Balassa *et al* (1982):

$$a_{ij}^{w} = \frac{(1 + t_j)}{(1 + t_i)} a_{ij}$$

relating the post-protection (a_{ij}) and free trade (a_{ij}^{w}) IO coefficients. Tariffs imposed on inputs would discourage the production of *j* (thus reduce output) and therefore $a_{ij} > a_{ij}^{w}$ while tariffs on output would encourage production of output *j* thus $a_{ij} < a_{ij}^{w}$.

Transport Costs

Transport costs are a natural barrier to trade. Effective rates of protection arising from transport costs are analysed relative to a situation where there are no transport costs. Several studies (Amjadi and Yeats 1995, Yeats 1994) argue that transport costs are more detrimental to African export competitiveness than tariff barriers and account for the decline in Africa's share in world trade. In 1990/91 transport costs accounted for 15% of the value of the regions exports (Amjadi and Yeats 1995). In Kenya the *ad valorem* freight rates for some sectors are even higher than those cited by Amjadi and Yeats (1995). In the horticulture sector in Kenya for instance, transport costs are cited as one of the key challenges to competitiveness. In rose marketing transport to market accounts for 69% of total costs translating to Kshs 6.16 per stem; estimating the price of a stem at Kshs. 17 in the international market then the transport component translates to an *ad valorem* rate or an implicit tax of 35%. For coffee, transport costs account for 6-7% of value.

Bulk transportation in Kenya is handled between Kenya Railways and private trucks. The Railway network operates on a two rates system, up direction from Mombassa to the mainland and down direction from the mainland to the port. The up direction rates are higher than the down direction rates reflecting the demand pattern determined by the Kenyan pattern of trade; there is a higher tonnage of imports to be ferried in the up direction than the exports in the down direction. Furthermore, the competition from roads is much stiffer in the down direction, the trucks usually have no tonnage after delivering imports and they charge very low rates for downward bound cargo and thus drive down the down direction rates even for railway. They are often interested in covering their fuel costs since 70% of the down direction traffic is empty trucks.

This pattern of trade is also reflected in the lead times of container clearance at the Mombasa port. Table 1 shows that on average it takes 4 days to clear an outward bound container both 20ft and 40ft compared to 9-10 days for inward bound containers. Further the findings from a recent growth and competitiveness report (World Bank 2004) indicate that customs procedures are another source of delay and informal payments by freight forwarders are used to accelerate the process. The evidence from the report indicates that a "vessel delay surcharge" compounds the problems at the port for importers.

Table 1 Clearing of Container Average (No of days)

	OUTWARD CLEARING		INWARD CLEARING		COST ($)
	2002	*2001*	*2002*	*2001*	
20 ft	4	7	10	18	1174
40 ft	4	8	9	19	2112

Source: World Bank/KIPPRA RPED Survey, 2003

The rail line has two corridors to Uganda, the southern corridor through Kisumu and the Northern corridor through Malaba. The southern corridor is a more efficient route because of the Wagon ferry service over Lake Victoria, through this corridor it is possible to transfer wagons from rail to ferry. However, the axle limit to 36 metric tonnes along the Nakuru—Kisumu route constrains the potential of a profitable route. The northern corridor Mombasa- Malaba- Kampala which has a higher axle load limit poses specific challenges; the rates within Uganda, Malaba –Kampala are very high to the extent they deter potential users of the line. Indeed some transporters use the line to Malaba and then switch to trucks which again reduce efficiency through transhipment and double handling.

In determining the transport tariffs other transporters use the rail rates as a benchmark for transporting cargo in the upward direction. Though the railway system has a higher capacity, the major disadvantage is inefficiency in transit times due to lack of door to door delivery. Since the major industries do not have warehouses along the railway line, the option entails transhipment and double handling—from wagons to trucks and from trucks to warehouse, this increases costs lead time in delivery.

Between 1990 and 1996-2000 the tonnage moved by Kenya railways declined 3.1 Million metric tonnes to 1.6 metric tonnes. Approximately 30% of the cargo handled at the Mombassa port is carried via the railway network, in the year 2002/03 for instance Kenya Railways ferried 2.3 million tonnes of cargo. After a period of low tonnage, the railway system is regaining its position as a key transporter following the implementation of axle load limits for trucks, the high capacity of the rail then makes it a more efficient option.

In the case of transport costs, the effective rate of protection is the percentage change in value added per unit as a result of freight costs relative to the situation in the absence of such costs. Equation [7] is modified as:

$$\eta_j = \frac{d_j - \sum_{i}^{n} a_{ij} d_i}{1 - \sum_{1}^{n} a_{ij}} \qquad [8]$$

Where d_j and d_i be the *ad valorem* freight rates borne on output j and input i respectively and a_{ij} is as defined in [1].

Domestic transport costs explicitly tax domestic producers. Transport cost on final output and inputs jointly compound the magnitude of taxation. To estimate the effective implicit taxation model [8] will be adjusted to take into account the compounding effect of transport costs on inputs.

$$\eta_j = \frac{d_j + \sum_{i}^{n} a_{ij} d_i}{1 - \sum_{1}^{n} a_{ij}} \qquad [9]$$

The international freight rates d_j and d_i are computed using data from the Kenya Revenue Authority (KRA). The data is obtained at 8 digit level SITC; entries where freight data are not available are dropped and the remaining entries are aggregated to the three digit level and the *ad valorem* freight rate computed as the difference between the cif and fob value divided by the cif value.

$$d_j = \frac{c_j - f_j}{c_j} \qquad [10]$$

where c_j and f_j are the cif and fob values for industry j respectively, d_i is computed by weighting the d_j by the deflated technical coefficients.

The internal transport costs are computed based on the scheduled railway tariff for the years 1993, 2001 ad 2003. The Kenya Railways schedule gives the rate per tonne per kilometre, the total transport charges therefore depend on the distance hauled. To estimate the *ad valorem* transport rate export unit prices are obtained from the customs data set, the unit prices are used to estimate the ton value for each commodity. The transport cost per ton is divided by the ton value and multiplied by the distance. In the absence of accurate distance covered for each commodity we use the distance between Nairobi and Mombasa as an average, the estimates are thus conservative.

4 ESTIMATES AND RESULTS

The results by sector are presented in Table 2, from which industries are classified into four clusters: industries that have been disprotected throughout, industries that have enjoyed positive protection before and after liberalisation; industries that were protected but are now disprotected (the losers), and industries that were disprotected before liberalisation but now enjoy protection (the gainers). Two estimates are provided for 1997/2000, and one is neither consistently higher nor lower than the other – only were both agree broadly can be make a firm inference.

The first category includes petroleum based industries, manufacture of metallic products and paints & detergents; all have negative values for all estimates. The disprotection is generally high and indicates that inputs are more protected than these final products. Beverages and tobacco had by far the most negative figure in 1990/94, although this fell significantly and may have turned to small protection by 2000. However, the negative rates for beverages and tobacco reflect infinite protection, rather than negative protection, as it is $1 - \sum a_{ij}$ that is negative. In this case, the

cost of inputs, if valued properly at world prices, exceeds the value of the output. By 2000 there appears to be some positive value-added.

Table 2 Nominal and Effective Rates of Protection, 1990-2000[a]

	Average NRP		Average ERP		
Sector	1990-1994	1997-2000	1990-1994	1997-2000	1997-2000[b]
7 Mfg . Bev & Tobacco	0.43	0.15	-18.53	-3.26	0.19
19 Mfg . Met prod's & mach	0.10	0.11	-0.52	-0.38	-0.39
17Mfg . Other chemicals	0.14	0.05	0.29	-0.23	-0.10
16 Mfg . Paint Det & soap	0.08	0.06	-0.08	-0.15	-0.11
14 Mfg . Petroleum prod's	0.79	0.14	-1.42	-0.13	-0.14
1 Traditional economy	0.00	0.00	0.00	0.00	0.00
8 Mfg . Raw Textiles	0.14	0.07	0.14	0.05	0.07
3 Fishing and Forestry	0.17	0.07	0.15	0.06	0.07
13 Mfg . Paper print & publ	0.06	0.06	0.01	0.08	0.08
4 Mining and Quarrying	0.09	0.11	-0.15	0.16	0.18
2 Agriculture	0.04	0.19	0.03	0.20	0.19
18 Mfg . Non Metal min prod's	0.13	0.12	-0.61	0.21	0.15
9 Mfg . Finished Textiles	0.27	0.15	0.39	0.25	2.40
15 Mfg . Rubber prod's	0.20	0.15	0.27	0.31	0.26
5 Mfg . Food prep's	0.10	0.15	0.04	0.42	0.28
12 Mfg . Wood prod's	0.24	0.19	0.14	0.50	0.32
11 mfg . Leather & Footwear	0.22	0.23	0.88	0.97	0.65
6 Mfg . Bakery prod's	0.37	0.20	5.93	1.45	-0.09
10 Mfg . Clothing	0.13	0.36	0.12	1.77	1.44
AVE	**0.20**	**0.13**	***-0.68***	***0.12***	***0.29***

Notes: Estimates based on the 1990 Input-Output Table.

a given the variation across individual years (Appendix Table A3), figures report average for 1990 and 1994 and for 1997 and 2000.

b estimates computed from a 1997 Input-Output Table updated by the author from the 1990 table.

In the second category are agriculture, fishing and forestry, paper, raw and finished textiles, leather and footwear, wood products and rubber industries. In this group of industries the general trend is a marginal increase in the level of effective protection. Manufacture of bakery products also appears in this category, with very high rates of protection, although may have faced negative protection in 2000 (suggesting protection on sugar and cereals).

The industries that have gained from liberalisation (from negative to positive rates of protection) are non-metallic mineral industries and mining and quarrying. Sectors in which protection increased could also be considered as having gained; this is unambiguously so for agriculture, manufactured foods, wood products and clothing. Protection in some other sectors may have risen, but the two estimates for 1997/2000 differ. Only one sector, other chemicals, experienced a strict loss in the sense of moving from positive to negative protection, although two sectors experienced declines in protection (raw textiles, fishing and forestry) according to both 1997/2000 estimates.

Effective rates of protection give a broad indication of the direction of resource pulls within the economy. It would be expected that within the tradeable goods sector there would be a shift in resources towards manufacture of bakery products and clothing and textiles industries which enjoy the highest levels of protection.

The Impact of EAC Customs Union

The EAC customs union became effective in 2005, when the three members adopted a common external tariff rate of: 0% for raw materials, 10% for semi-finished goods and a maximum tariff of 25% for all finished products. As the tariff bands in Kenya were higher than the CET rates, implementation of the protocol should reduce the tariff barriers.

The simulations are based on the model above but, instead of using the actual tariff as computed above, t_j is the scheduled CET of 25% while t_i takes the value of 0% and 10%. As the data do not permit identification of specific inputs for each sector, i.e. the proportion of inputs attracting the 0% or 10% rates, two sets of estimates are provided each applying one of the rates on all inputs. The results are compared with the pre-CET scheduled top rate of 35% (Table 3).

Table 3 EAC Customs Union Simulations

	NRP		ERP		
Sector	2000	2005	2000	2005 (25%)	2005 (10%)
1 Traditional economy	0.00	0.00	0.00	0.00	0
2 Agriculture	35.00	25.00	0.36	0.26	0.10
3 Fishing and Forestry	35.00	25.00	0.36	0.25	0.10
4 Mining and Quarrying	35.00	25.00	0.58	0.41	0.16
5 Mfg . Food prep's	35.00	25.00	0.96	0.69	0.27
6 Mfg . Bakery prod's	35.00	25.00	0.70	0.50	0.20
7 Mfg . Bev & Tobacco	35.00	25.00	-6.11	-4.36	-1.75
8 Mfg . Raw Textiles	35.00	25.00	0.44	0.31	0.13
9 Mfg . Finished Textiles	35.00	25.00	0.49	0.35	0.14
10 Mfg . Clothing	35.00	25.00	1.16	0.83	0.33
11 mfg . Leather & Footwear	35.00	25.00	0.65	0.46	0.19
12 Mfg . Wood prod's	35.00	25.00	0.66	0.47	0.19
13 Mfg . Paper print & publ	35.00	25.00	0.55	0.40	0.16
14 Mfg . Petroleum prod's	35.00	25.00	-0.16	-0.11	-0.05
15 Mfg . Rubber prod's	35.00	25.00	0.64	0.46	0.182
16 Mfg . Paint Det & soap	35.00	25.00	0.50	0.36	0.14
17Mfg . Other chemicals	35.00	25.00	0.97	0.69	0.28
18 Mfg . Non Metal min prod's	35.00	25.00	0.66	0.47	0.19
19 Mfg . Met prod's & mach	35.00	25.00	-1.17	-0.84	-0.33
AVE	33.16	23.68	0.12	0.08	0.03

The results indicate that the protective barriers will gradually decline from an average of 12% to about 3% when the EAC protocol becomes effective. This compares favourably with an average of 16% for the year 2000, based on the actual tariff. The other interesting observation is that the ERP computed from the scheduled tariff is 12% while using the actual tariff the ERP is 16% showing that using the scheduled tariff understates the ERP, in this case by four percentage points.

International Freight

Implicit protection of domestic producers arising from international freight rates reflects an overall reduction in effective rates of protection. Compared to a high 700% for bakery products in 1990, the highest in 2000 was 29% for clothing and textile industries and forestry and fishing. The results are presented in Table 4.

Table 4. Protection Arising From International Freight Transport Costs

	NRP		ERP	
Sector	1990-94	1997-2000	1990-94	1997-2000
1 Traditional economy	0.00	0.00	0.00	0.00
2 Agriculture	0.24	0.11	0.24	0.11
3 Fishing and Forestry	0.20	0.22	0.21	0.24
4 Mining and Quarrying	0.30	0.19	0.56	0.48
5 Mfg . Food prep's	0.17	0.10	0.12	0.19
6 Mfg . Bakery prod's	0.31	0.08	3.62	0.08
7 Mfg . Bev & Tobacco	0.16	0.16	-2.21	0.31
8 Mfg . Raw Textiles	0.17	0.13	0.20	0.65
9 Mfg . Finished Textiles	0.18	0.07	-0.07	0.48
10 Mfg . Clothing	0.19	0.17	0.52	0.75
11 mfg . Leather & Footwear	0.29	0.10	0.99	0.17
12 Mfg . Wood prod's	0.19	0.11	0.23	0.17
13 Mfg . Paper print & publ	0.20	0.10	0.28	0.15
14 Mfg . Petroleum prod's	0.19	0.05	0.14	0.12
15 Mfg . Rubber prod's	0.25	0.08	0.40	0.14
16 Mfg . Paint Det & soap	0.15	0.08	0.12	0.05
17Mfg . Other chemicals	0.21	0.11	0.36	0.22
18 Mfg . Non Metal min prod's	0.53	0.11	1.09	0.21
19 Mfg . Met prod's & mach	0.43	0.10	-1.36	-0.34
Average	**0.23**	**0.11**	**0.29**	**0.22**

The results are presented as two year averages to smooth the data, 1990 and 1994 and 1997 and 2000. The results reflect an overall decline in the *ad valorem* transport costs from 23% when liberalisation started in early 1990s to 11% by the year 2000. However, the protection of value added remains high reflecting a seven percentage point decline from 29% to 22% during the period. This shows that although policy induced barriers (tariffs) have reduced the level of protection, natural protection via transport costs remain high. The implication is that intra-regional trade or 'south south' trade where transport costs are not prohibitive holds high potential. On the other hand if Kenya has to diversify to north-south trade, international freight rates have to be reduced significantly.

The average nominal rate of implicit taxation due to transport costs in the early 1990s was 14%, very close to the rates cited by Collier and Gunning (1999). The rates have declined significantly to about 7% in 2003, mainly due to liberalisation and competition (Table 5). However when the technology of production is taken into account for transport cost on inputs, the effective taxation remains high.

Table 5. Implicit Taxation from Domestic Transport Costs

Sector	1993	2001	2003	1993	2001	2003
	NRP			ERP		
1 Traditional economy				-	-	-
2 Agriculture	0.18	0.13	0.09	0.21	0.15	0.10
3 Fishing and Forestry	0.01	0.01	0.01	0.02	0.01	0.01
4 Mining and Quarrying	0.62	0.46	0.29	0.94	0.72	0.45
5 Mfg . Food prep's	0.07	0.05	0.03	0.78	0.52	0.33
7 Mfg . Bev & Tobacco	0.14	0.10	0.06	0.86	0.32	0.21
8 Mfg . Raw Textiles	0.06	0.04	0.03	0.14	0.17	0.11
9 Mfg . Finished Textiles	0.06	0.04	0.03	0.13	0.15	0.10
10 Mfg . Clothing	0.19	0.14	0.09	0.43	0.30	0.19
11 mfg . Leather & Footwear	0.01	0.01	0.01	0.31	0.19	0.12
13 Mfg . Paper print & publ	0.14	0.11	0.07	0.45	0.32	0.21
14 Mfg . Petroleum prod's	0.03	0.02	0.01	1.47	1.02	0.65
15 Mfg . Rubber prod's	0.07	0.05	0.03	0.28	0.19	0.12
16 Mfg . Paint Det & soap	0.23	0.17	0.11	0.87	0.59	0.38
17Mfg . Other chemicals	0.11	0.08	0.05	0.58	0.36	0.23
18 Mfg . Non Metal min prod's				0.06	0.03	0.02
19 Mfg . Met prod's & mach	0.18	0.13	0.09	0.83	0.23	0.15
AVE	**0.14**	**0.10**	**0.07**	**0.49**	**0.31**	**0.20**

From an average of 49% in 1993 the effective implicit taxation declined to 31% in 2001 and to 20% by 2003. Again it is important to pint out that the rates are computed based on the railway scheduled tariff and based on a Nairobi Mombasa distance so the rates are based on a conservative estimate and could be even higher than computed in this study. The high rates of taxation coupled with other domestic transaction costs reduce the competitiveness of Kenyan exports.

5 CONCLUSIONS AND POLICY IMPLICATIONS

The influence of trade policy on growth performance introduces a paradox in the structure of protection for an economy in the process of development. On the one hand there was a perceived need to protect infant industries — perceived as a road

map to industrialisation through high tariffs and non-tariff barriers, while generating the much needed revenue for the government. On the other hand the price raising effect even for intermediate inputs and the distortions created by the protective barriers increase inefficiency in the domestic market particularly in manufacturing and agriculture, reducing their competitive potential and the growth prospects envisaged. This paradox is clearly reflected in the effective structure of protection in Kenya.

Ideally trade liberalisation is intended to increase the price of exportables relative to importables to switch production in favour of exports away from import competing goods. The price incentive is also intended to constrain domestic demand to increase the scope for exports. However the outcomes from policy changes are at best unpredictable particularly given the other policy changes which may lead to conflicting signals, the most import one in this case being the exchange rate policy which might inadvertently reverse the trade policy intent.

International freight costs form a natural barrier to trade; assuming the costs computed in this study are borne by the neighbouring countries in the same magnitude, then the neighbouring countries form a captive market for the country that emerges as a competitive producer, even when tariff barriers are removed under WTO or Economic Partnership Agreements. Indeed, as the more industrial country in the EAC block, Kenya should seek to increase efficiency in production to ensure she retains the captive market. However high internal transport costs threaten the competitiveness of Kenyan producers; improving the road and railway network, and reforms in Kenya Railways, are some of the measures that are necessary to give Kenya a competitive edge. Increasing export cargo at Mombasa port to even out inward bound and outward bound cargo would also reduce inefficiency and lead times at the port.

From the analysis above, it is evident that though nominal tariffs have been significantly reduced, the structure of protection for some sectors is still negative. Though the magnitude may vary depending on the methodology and approach, the results nevertheless point to the intricacies in the structure of protection, where the outcomes depend not just on the nominal tariffs but also on the production technology.

The estimation of the true structure of protection poses a number of challenges. First, trade policy is not the responsibility of a single ministry or agency. In Kenya the policies cut across the Ministries of Finance, Trade/ Commerce and Industries (depending on the period in question) and sometimes even the Agriculture Ministry. Tracing and quantifying the impact of trade policy across all the agencies then becomes a difficult task. The second challenge is that new measures are introduced in an *ad hoc* manner during crises and remain in place even after the crisis is over. Kenya's export and import policy displays a complex mix of import substitution and export promotion (Appendix 2). Furthermore the price incentive in the tariff structure dictates that consumers switch to the consumption of non-tradables despite the policy intent. Clearly, isolating the net impact of trade policy is not a straightforward exercise. Indeed the analysis overlooks the rent seeking activity associated with protection.

The third challenge is in the underlying assumptions that IO coefficients are fixed, that the elasticities of demand for exports and the supply of imports are infinite, that all tradable goods remain traded even after tariffs are levied, that fiscal and monetary policies maintain internal balance and finally the exclusion of non-traded inputs in the production of final goods. Despite these weaknesses and challenges, EPC continue to be widely used as it gives policy makers insights into the direction of resource pulls without the complex simulations. The findings from this study thus give a general direction of resource pulls within the Kenyan economy.

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Appendix 1 Effective Protection Rates in Kenya: Additional Estimates

Table A1. Manufacturing Survey Approach

Industry	NRP (%)	ERP (1968) % (Phelps & Wasow)	ERP (1985) % World Bank	NRP (1988) % Maxwell Stamp
Misc foods	77	119	111	-21
Milling	46	69		
Canning	17	27		
Soft drinks	10	-11		
Textiles	66	81		50
Beverages & Tobacco			38	
Garments	43	31	126	
Knitwear	45	72		
Sawmilling, timber	1	-1		
Paper products	36	74	6	-23
Furniture & Fixtures	19	27		
Pharmaceuticals	15	23	129	
Chemicals	0	-3	211	
Misc Chemicals	17	30		
Paint	44	95		
Cement	0	-10	248	
Glass Products	18	29		
Metal products	10	16		
Iron & Steel			312	12
Elec Equipment			312	
Leather & footwear			80	47
Motor Vehicles				262
Average	18	34	137[1]	

[1] Excluding food beverages and tobacco

Table A2 Effective Protection Coefficients for Kenya[2]

Effective Protection Rates for Kenya

	D & G			K & W
	1976	1981	1986	1986
Traditional Economy	-1.5	-3.3	-2.3	-2.3
Agriculture	3.2	2.4	1.7	13
Forestry and Fishing	13	25.5	10.2	12.6
Mining and Quarrying	59.1	-23.8	-34.2	64
Mfg. Food Processing	79.4	71.7	665	527.9
Mfg. Bakery Products	62.1	687	65.5	67.9
Mfg. Bev. & Tobacco	222	319	555	855.5
Mfg. Raw Textiles	65.5	62.3	118	141.7
Mfg. Finished textiles	96.8	136	70.3	83.4
Mfg. Clothing	102.1	-0.2	16.5	22.1
Mfg. Leather	200	103	74.9	90.7
Mfg. Wood Products	30.2	133	27.4	68.7
Mfg.Paper Products	22.7	17	29.7	38.8
Mfg. Petroleum	-46.3	16.3	-159	44.4
Mfg. Rubber products	18.3	49.1	41.8	51.6
Mfg. Paint Detergents	78.7	189	121	162.4
Mfg. Other Chemicals	9.7	38.1	3.9	15
Mfg. Non Metals	43.4	431	-12.1	120.8
Mfg. Metallic Products	17.9	25.1	19.9	32.9
Repair of Transport Equipmer	57.9	32.8	4.3	14.1
Electricity	-5.8	-9.7	-22.8	-9.9
Water	-2.9	-6.4	-10.7	-5.5
construction	-17.4	-22.6	-28.9	-18.2
Trade	-1.2	-3.1	-5.6	-3
Transportation	-10	-10.3	-23.7	-11.4
Communications	-7.2	-5.8	-6	-5.8
Restraustrants & Hotels	-25.5	-27.1	-32.6	-31.3
Ownership of Dwellings	0	0	0	0
Financial Services	-0.6	-1.5	-1.9	-1.2
Non Govt Services	-6	10.5	240	-6.4
Govt Public Admin	-2.8	-6.2	-11.5	-6.5
Govt Education	-1.5	-2.5	-4	-1.6
ovt Health	-3.2	-6.5	-8.2	-7.6
Govt Agricultrure	-5.1	-9.2	-19.1	-7.6
Govt Other	-2.9	-6.6	-10.2	-8.8
mean				65.72
Std. Deviation				167.99

[2] D&B refers to Damus and Beaulieu (1989) while K & W refers to Keyfitz and Wanjala (1991)

Table A3 Nominal and Effective Rates of Protection

	NRP				ERP				1997_table	
Sector	1990	1994	1997	2000	1990	1994	1997	2000	1997[b]	2000[b]
1 Traditional economy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 Agriculture	0.05	0.03	0.18	0.19	0.04	0.02	0.19	0.20	0.19	0.20
3 Fishing and Forestry	0.32	0.02	0.06	0.07	0.32	-0.02	0.06	0.07	0.06	0.07
4 Mining and Quarrying	0.06	0.11	0.11	0.10	-0.19	-0.11	0.16	0.16	0.18	0.17
5 Mfg . Food prep's	0.05	0.16	0.13	0.17	-0.43	0.50	0.23	0.60	0.16	0.40
6 Mfg . Bakery prod's	0.59	0.15	0.19	0.21	11.87	-0.01	1.65	1.26	- 0.11	- 0.07
7 Mfg . Bev & Tobacco	0.65	0.20	0.15	0.15	-36.44	-0.62	-3.83	-2.70	0.21	0.17
8 Mfg . Raw Textiles	0.13	0.15	0.05	0.08	0.13	0.16	0.02	0.07	- 0.05	0.18
9 Mfg . Finished Textiles	0.27	0.26	0.14	0.15	0.40	0.38	0.25	0.25	2.38	2.41
10 Mfg . Clothing	0.07	0.20	0.30	0.41	-0.27	0.51	1.44	2.10	1.17	1.70
11 mfg . Leather & Footwear	0.22	0.23	0.23	0.23	0.97	0.79	1.00	0.94	0.67	0.63
12 Mfg . Wood prod's	0.28	0.21	0.21	0.18	0.28	0.00	0.55	0.46	0.35	0.29
13 Mfg . Paper print & publ	0.09	0.02	0.06	0.06	0.07	-0.05	0.09	0.08	0.08	0.08
14 Mfg . Petroleum prod's	0.69	0.89	0.16	0.13	-1.20	-1.64	-0.15	-0.11	- 0.17	- 0.12
15 Mfg . Rubber prod's	0.19	0.21	0.15	0.15	0.25	0.29	0.31	0.31	0.26	0.26
16 Mfg . Paint Det & soap	0.11	0.06	0.06	0.05	0.14	-0.29	-0.08	-0.21	- 0.05	- 0.16
17Mfg . Other chemicals	0.18	0.11	0.05	0.05	0.58	-0.01	-0.21	-0.25	- 0.08	- 0.11
18 Mfg . Non Metal min prod's	0.23	0.03	0.13	0.11	-0.13	-1.08	0.22	0.21	0.15	0.15
19 Mfg . Met prod's & mach	0.15	0.06	0.12	0.10	-0.63	-0.41	-0.40	-0.35	- 0.42	- 0.36
AVE	***0.23***	***0.16***	***0.13***	***0.14***	***-1.28***	***-0.08***	***0.08***	***0.16***	***0.26***	***0.31***

1997b and 2000b Rates are computed from a 1997 input output table updated by the author from the 1990 Table.

Appendix 2 Chronology of Trade Policy Episodes

Period	Imports	Exports
1963-1970 High growth rates	Customs agreement between Uganda Tanzania and Kenya with a common tariff and the use of quantitive restrictions. Exchange controls on sterling transactions . exchange controls become a responsibility of CBK Measures to eliminate the import of goods made in Kenya.	
1970-1974 A 398% increase in the price of oil --extreme loss of foreign reserves.	Import bans, quotas and licenses introduced. Exchange control approvals required—369 items under restriction, 150 items banned 147 items on quota. Imports over Kshs 2000 require forex license.	
1974-1980 Tighter controls	Contain the growth of imports to 25 on annual basis and. Import demand to be curbed through quantitive restrictions and high taxes. Import substitution strategy –as measure to contain import demand. Import deposit Scheme introduced	Increase the growth of exports by 8% per annum Export growth encouraged through an export subsidy of 10 % on manufactured goods with at least 30% value added. Marketing boards formed for marketing of all exports of coffee, tea, cotton and horticulture.
1980 –1985 SAL by world Bank aims: Reduced protection, devaluation &market lib.	• Replace quantitive restrictions with tariffs. • Forex allocation committee & Import export licensing office to	Eliminate the IS bias against exports. Export promotion measures: • Export credit and guarantee scheme • Simplify export compensation

Export insurance scheme	administer controls • Imports of finished goods deleted from GPCO • Import Management committee (IMC) formed Transparency through publication of 3 import schedules (I IIA & IIB)	scheme for approved categories of exports • Export compensation raised to 20%
1986 – 1990 Import Substitution	Processing charge for import application increased from 1% to 1.5% (value +freight)	Introduction of manufacture Under Bond--MUB
1991 –1995 full liberalisation	Removal of forex controls replacement of QRs by tariffs and tariff rationalisation	• COMESA free Trade Area • Export Processing Zone bill • MUB VAT zero rated
1996-2000		Export compensation reduced from 20% to 18%

Annex 5 1990 Trade Data Kshs Million

I-O Sec	qty	fob	cif	cust_val	duty	salestax	tariff 1	tariff2	tariff 3	tariff 4
2	611.0	648	1,350	4,590	73	2	5%	5%	2%	2%
3	10.3	0	1	442	0	0	48%	32%	0%	0%
4	511.0	300	403	1,220	27	15	7%	6%	2%	2%
5	379.0	1,450	1,800	3,910	100	46	6%	5%	3%	2%
6	0.4	0	0	11	1	0	146%	59%	5%	5%
7	293.0	48	61	11,100	116	84	190%	65%	1%	1%
8	32.0	14	16	424	2	0	15%	13%	1%	1%
9	21.7	541	668	1,190	249	62	37%	27%	21%	17%
10	11.1	160	301	339	23	10	8%	7%	7%	6%
11	17.1	38	56	713	16	9	28%	22%	2%	2%
12	159.0	629	722	1,160	274	39	38%	28%	24%	19%
13	8.2	471	420	680	40	21	9%	9%	6%	5%
14	1,890.0	192	307	7,740	689	3,430	224%	69%	9%	8%
15	21.5	505	496	530	120	132	24%	19%	23%	18%
16	27.8	1,560	1,640	2,250	195	41	12%	11%	9%	8%
17	319.0	3,230	3,690	4,630	804	170	22%	18%	17%	15%
18	481.0	1,840	2,080	3,170	606	277	29%	23%	19%	16%
19	409.0	15,100	18,400	28,600	3,130	1,460	17%	15%	11%	10%
21	0.2	36	60	62	6	3	10%	9%	10%	9%
Total		**26,762**	**32,471**	**72,761**	**6,470**	**5,800**				

tariff 1 duty/ C.I.F value
tariff 2 duty/ (C.I.F value +duty)
tariff 3 duty/ (customs value)
tariff 4 duty/ (customs value +duty)

Annex 6 Computation of 1990 Freight Rates

I-O Sec	fob	cif	qty	cust_val	duty	salestax	CIF-FOB	Rate1	rate2
2	583	687	100	677	66	2	104.10	18%	15%
3	0	0	0	0	0	0	0.03	17%	15%
4	286	373	167	370	19	10	86.90	30%	23%
5	964	1,158	127	1,146	94	45	193.80	20%	17%
6	0	0	0	0	0	0	0.04	89%	47%
7	89	111	2	103	16	2	21.76	24%	20%
8	14	16	2	16	2	-	2.04	15%	13%
9	719	930	14	840	107	30	211.50	29%	23%
10	172	204	5	147	9	3	31.70	18%	16%
11	34	55	2	38	11	6	20.27	59%	37%
12	601	723	36	690	142	20	122.30	20%	17%
13	353	421	6	380	19	10	68.50	19%	16%
14	1,713	2,274	1,200	4,828	16	6	561.00	33%	25%
15	402	468	16	357	78	110	66.40	17%	14%
16	1,292	1,508	7	1,386	111	24	216.00	17%	14%
17	3,257	3,882	260	3,817	587	125	625.00	19%	16%
18	1,595	1,884	60	1,593	328	145	289.00	18%	15%
19	14,060	16,440	207	15,230	1,019	502	2,380.00	17%	14%
21	37	43	0	39	5	2	5.89	16%	14%

Rate 1 (cif-fob)/fob
Rate 2 (cif-fob)/cif

Annex 7 **Trade Distorted Coefficients matrix**

Sectors		TRADCON	AGRIC	FOFISH	MINE	MANFD	BAKE	BEVS	RAWTEX	FINTEX	CLOTH	FTWEAR	WOODPROI
1	TRADCON	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	AGRIC	0.000	0.023	0.000	0.000	0.223	0.001	0.011	0.107	0.000	0.005	0.032	0.000
3	FOFISH	0.027	0.000	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.047
4	MINE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	MANFD	0.000	0.013	0.000	0.000	0.386	0.582	0.269	0.000	0.000	0.000	0.310	0.000
6	BAKE	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	BEVS	0.000	0.000	0.000	0.000	0.000	0.000	0.062	0.000	0.000	0.000	0.000	0.000
8	RAWTEX	0.000	0.006	0.014	0.018	0.005	0.000	0.000	0.042	0.107	0.002	0.001	0.008
9	FINTEX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.290	0.014	0.008
10	CLOTH	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.000	0.000
11	FTWEAR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000
12	WOODPROD	0.021	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.107
13	PPUB	0.000	0.000	0.000	0.014	0.042	0.006	0.018	0.007	0.011	0.043	0.058	0.003
14	PTROL	0.000	0.010	0.046	0.260	0.075	0.013	0.117	0.080	0.067	0.060	0.025	0.254
15	RUBBER	0.000	0.001	0.002	0.006	0.002	0.000	0.003	0.000	0.000	0.002	0.107	0.008
16	PDSOAP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
17	CHEMCS	0.000	0.031	0.000	0.014	0.031	0.001	0.015	0.017	0.091	0.009	0.074	0.025
18	NONMET	0.065	0.000	0.000	0.081	0.004	0.002	0.024	0.002	0.001	0.001	0.000	0.006
19	METALICS	0.026	0.004	0.000	0.039	0.066	0.002	0.042	0.065	0.027	0.086	0.025	0.114
20	REPEQP	0.000	0.001	0.011	0.049	0.014	0.003	0.018	0.010	0.005	0.019	0.004	0.050
21	ELEC	0.000	0.004	0.000	0.005	0.005	0.001	0.005	0.007	0.010	0.006	0.006	0.003
22	WATER	0.000	0.000	0.000	0.003	0.001	0.001	0.009	0.000	0.005	0.001	0.000	0.000
23	CONSTC	0.000	0.000	0.000	0.003	0.001	0.000	0.001	0.000	0.000	0.001	0.000	0.001
24	TRADE	0.005	0.013	0.001	0.013	0.041	0.003	0.043	0.022	0.029	0.070	0.030	0.033
25	TRANSP	0.000	0.002	0.000	0.049	0.010	0.000	0.020	0.002	0.002	0.002	0.001	0.005
26	COMMUNC	0.000	0.000	0.000	0.001	0.003	0.000	0.003	0.005	0.006	0.009	0.001	0.003
27	RESTHOT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
28	DWELL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	FINSERV	0.000	0.000	0.000	0.053	0.036	0.006	0.035	0.062	0.072	0.175	0.011	0.056
30	NONGVTSERV	0.000	0.000	0.000	0.017	0.005	0.001	0.008	0.002	0.005	0.010	0.018	0.005
31	PADMIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	GOVEDU	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000
33	GOVHET	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34	GOVAGR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	GOVOT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36	OTH	0.000	0.000	0.000	0.059	0.007	0.014	0.005	0.012	0.009	0.057	0.021	0.015

Annex 8 **Trade Free (Deflated) Coefficients matrix**

Sectors	*Ad valorem* Ta	TRADCON	AGRIC	FOFISH	MINE	MANFD	BAKE	BEVS	RAWTEX	FINTEX	CLOTH	FTWEAR	WOODPROI	PPUB
1	0.00	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.05	0.000	0.023	0.000	0.000	0.224	0.001	0.018	0.116	0.000	0.006	0.037	0.000	0.000
3	0.32	0.020	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.000
4	0.06	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	0.05	0.000	0.013	0.000	0.000	0.386	0.881	0.423	0.000	0.000	0.000	0.359	0.000	0.000
6	0.59	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	0.65	0.000	0.000	0.000	0.000	0.000	0.000	0.062	0.000	0.000	0.000	0.000	0.000	0.000
8	0.13	0.000	0.005	0.016	0.017	0.004	0.000	0.000	0.042	0.120	0.002	0.001	0.010	0.001
9	0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.245	0.013	0.008	0.001
10	0.07	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.000	0.000	0.000
11	0.22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000
12	0.28	0.016	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.107	0.000
13	0.09	0.000	0.000	0.000	0.014	0.040	0.008	0.028	0.008	0.013	0.042	0.065	0.004	0.416
14	0.69	0.000	0.006	0.036	0.163	0.047	0.013	0.115	0.053	0.050	0.038	0.018	0.191	0.024
15	0.19	0.000	0.001	0.002	0.006	0.001	0.000	0.004	0.000	0.000	0.002	0.110	0.008	0.001
16	0.11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000
17	0.18	0.000	0.028	0.000	0.013	0.028	0.002	0.021	0.017	0.098	0.008	0.077	0.027	0.030
18	0.23	0.053	0.000	0.000	0.070	0.004	0.002	0.033	0.002	0.001	0.001	0.000	0.006	0.000
19	0.15	0.022	0.004	0.000	0.036	0.061	0.003	0.061	0.064	0.030	0.080	0.026	0.127	0.046
20	0.00	0.000	0.001	0.014	0.052	0.014	0.005	0.029	0.011	0.006	0.020	0.005	0.064	0.010
21	0.10	0.000	0.004	0.000	0.005	0.005	0.001	0.007	0.008	0.011	0.006	0.006	0.004	0.003
22	0.00	0.000	0.000	0.000	0.003	0.001	0.001	0.014	0.000	0.006	0.001	0.000	0.000	0.000
23	0.00	0.000	0.000	0.000	0.003	0.001	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.002
24	0.00	0.005	0.014	0.002	0.014	0.043	0.005	0.071	0.025	0.036	0.075	0.037	0.042	0.037
25	0.00	0.000	0.002	0.000	0.052	0.011	0.000	0.032	0.003	0.003	0.003	0.002	0.006	0.008
26	0.00	0.000	0.000	0.000	0.001	0.004	0.000	0.005	0.006	0.008	0.009	0.002	0.004	0.015
27	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
28	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	0.00	0.000	0.000	0.000	0.056	0.037	0.009	0.057	0.071	0.092	0.187	0.013	0.071	0.066
30	0.00	0.000	0.000	0.000	0.018	0.005	0.001	0.013	0.003	0.006	0.011	0.022	0.006	0.013
31	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000
33	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36	0.00	0.000	0.000	0.000	0.063	0.008	0.023	0.008	0.014	0.011	0.061	0.025	0.019	0.022

Annex 9 Computing 1990 ERP

$a_{ij}t_i$

Sectors	*Ad valorem* Ta	TRADCON	AGRIC	FOFISH	MINE	MANFD	BAKE	BEVS	RAWTEX	FINTEX	CLOTH	FTWEAR	WOODPROI	PPUB
1	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
2	0.05	-	0.001	-	-	0.011	0.000	0.001	0.006	-	0.000	0.002	-	-
3	0.32	0.007	-	0.000	-	0.000	-	-	-	-	-	-	0.015	-
4	0.06	-	-	-	-	0.000	-	-	-	-	-	-	-	-
5	0.05	-	0.001	-	-	0.020	0.046	0.022	-	-	-	0.019	-	-
6	0.59	-	-	-	-	0.000	-	-	-	-	-	-	-	-
7	0.65	-	-	-	-	-	-	0.041	-	-	-	-	-	-
8	0.13	-	0.001	0.002	0.002	0.001	-	-	0.006	0.016	0.000	0.000	0.001	0.000
9	0.27	-	-	-	-	-	-	-	-	0.014	0.066	0.004	0.002	0.000
10	0.07	-	0.000	-	-	0.000	-	-	-	-	0.003	-	-	-
11	0.22	-	-	-	-	0.000	-	-	-	-	-	0.011	-	-
12	0.28	0.004	-	-	0.000	0.000	-	0.001	-	-	-	-	0.030	0.000
13	0.09	-	0.000	-	0.001	0.003	0.001	0.002	0.001	0.001	0.004	0.006	0.000	0.036
14	0.69	-	0.004	0.025	0.113	0.032	0.009	0.079	0.037	0.035	0.026	0.012	0.132	0.017
15	0.19	-	0.000	0.000	0.001	0.000	0.000	0.001	-	-	0.000	0.021	0.002	0.000
16	0.11	-	-	-	-	0.000	-	-	-	-	-	-	0.000	-
17	0.18	-	0.005	-	0.002	0.005	0.000	0.004	0.003	0.017	0.001	0.014	0.005	0.005
18	0.23	0.012	-	-	0.016	0.001	0.000	0.007	0.001	0.000	0.000	-	0.001	0.000
19	0.15	0.003	0.001	-	0.005	0.009	0.000	0.009	0.009	0.004	0.012	0.004	0.018	0.007
tj - sum($a_{ij}t_{i)}$			**0.04**	**0.30**	**- 0.08**	**- 0.03**	**0.54**	**0.49**	**0.07**	**0.18**	**- 0.04**	**0.13**	**0.07**	**0.02**
1- sum(aij)-sum(mj)			**0.895**	**0.929**	**0.414**	**0.074**	**0.045**	**-0.013**	**0.557**	**0.456**	**0.162**	**0.132**	**0.245**	**0.303**
Ej			**0.04**	**0.32**	**- 0.19**	**- 0.43**	**11.87**	**- 36.44**	**0.13**	**0.40**	**- 0.27**	**0.97**	**0.28**	**0.07**