The terms of trade for commodity exports: A case study of Kenya

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The terms of trade for commodity exports: A case study of Kenya

Njoroge, Nancy Njambi, M.S.

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U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

THE TERMS OF TRADE FOR COMMODITY EXPORTS: A CASE STUDY OF KENYA

by

NANCY NJAMBI NJOROGE

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STATEMENT BY AUTHOR

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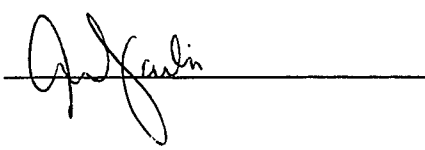
SIGNED: 

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This thesis has been approved on the date shown below:

Eric A. Monke
Professor of Agricultural
and Resource Economics

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ABSTRACT

The study estimated changes in the terms of trade of three Kenyan exports -- tea, coffee, and pyrethrum -- to test the validity of the theory of deterioration in the terms of trade for primary products. Several different measures of the terms of trade were considered. The results show no evidence of a secular deterioration. They also indicate that the terms of trade measure is extremely sensitive to the choice of the price index for manufactured goods. To evaluate the impact of domestic policies, costs and returns of the three exports were examined. The results show that the impact of policy distortions on profits is far greater than the impact of expected future world price declines. Future export expansion still is possible because policy changes can offset the effect of low world prices.

CHAPTER 1

INTRODUCTION

The role of international trade in development has been an on-going debate. Some economists conclude that trade contributes to a country's development. According to the theory of comparative advantage, countries that specialize in commodities produced at the lowest relative cost will increase real incomes. Trade allows more efficient use of domestic resources. Through the foreign exchange earned from exports, countries can import capital goods required for development. In addition to providing static gains, trade is viewed as a dynamic force that will stimulate other changes in the economy. As a country produces for a larger market, infrastructure associated with export production stimulates existing production activities and leads to growth in other domestic sectors. Trade stimulates technological change, raises factor productivity and allows the country to enjoy economies of scale.

Despite rapid growth in foreign trade, most developing countries have experienced a slow rate of development. Critics of trade argue that international trade impedes development in developing countries. One of the major criticisms is that there is a transfer of income from poor countries to developed countries through deterioration in

the commodity terms of trade. Other arguments against trade follow from price instability in the export markets. Critics believe that development is faster under a strategy that pursues rapid industrialization. To effect this strategy, import substituting industries -- set up by protecting domestic markets -- have been encouraged.

To further examine these issues, this thesis reviews the case for and against an export-led development strategy. The study will focus on two basic issues: the validity of a secular deterioration of terms of trade for primary products, and the impact of domestic policy and market changes on producers incentives.

A Review of Export Production in Kenya

The study uses empirical data for three of Kenya's agricultural exports -- tea, coffee, and pyrethrum. It examines the pattern of export production in Kenya and the impact of current policies on production incentives. Studies have categorized Kenya as one of the sub-Saharan countries that has followed an export-led development strategy, practicing a trade policy more liberal than that of most developing countries. The government has not taxed excessively its exports. To encourage production it does not charge duties on most agricultural inputs. This has

contributed to a fairly well developed export sector (Sharpley, 1986). Kenya has not diversified much from its traditional agricultural exports and about 50 percent of gross export earnings come from tea and coffee exports.

Present-day agricultural production in Kenya has been influenced by the colonial policies prior to independence in 1963. The period was characterized by large farms (averaging 800 hectares). Export production was dominated by plantations which depended on African labor to produce a large marketable surplus. Owners of large plantations benefitted from infrastructure investments, specialized marketing institutions, and research and extension services.

Production by smallholders was underdeveloped and the growing of export crops was strictly controlled. The introduction of the Swynnerton plan in 1954 changed the pattern of export production. Its main objectives were to intensify export production among smallholders by removing crop restrictions, to consolidate land to provide economic sizes of farm holdings through land registration, and to establish an effective land market.

Individual land titles provided smallholders with incentives for long-term improvements. As a result of the policy changes, between 1951 and 1960 the production of

arabica coffee and pyrethrum by smallholders increased rapidly. Some smallholders (especially those in high potential farming areas) benefitted from the established research and infrastructure services, and also learned the use of modern farm inputs like fertilizer (Jabara, 1985; Johnston, 1989).

Kenya's agricultural policy in the post-independence period has continued to promote smallholder exports. For example, under land resettlement schemes, the area under large-scale export production declined while smallholder acreage under export crops rose, particularly of tea. Between 1964 and 1972, agricultural output growth averaged about 4.6 percent and contributed to the rapid growth of farm incomes. The relatively liberal trade and development policies in the immediate post-independence period also contributed to the success of the export sector. To further promote smallholder export production, the government has encouraged the establishment of rural cooperative societies. They provide smallholders with basic inputs and other services such as transportation, credit, primary processing, and marketing.

Organization of the Study.

Chapter 2 reviews trade models and their applicability to developing countries. Theories of unequal exchange in

international trade also are presented. The chapter discusses the main criticisms against trade -- the infant industry argument, deterioration in the terms of trade and price instability in the world markets.

A reliance on primary exports means countries have to rely on the world markets. Often, changes in domestic incomes are linked with world market prices. Future price changes will determine the profitability of export crops. Chapters 3, 4, and 5 will focus on the world markets for tea, coffee, and pyrethrum. These chapters examine the factors that influence demand and price levels. The role of international commodity agreements, especially the coffee agreement, is also discussed. A knowledge of world markets is important in helping domestic policymakers determine long-term production goals.

Chapter 6 distinguishes between the different measures of terms of trade measures. It also discusses some of the statistical problems encountered in the construction of the various measures. To examine the validity of a secular deterioration of the terms of trade, the study provides empirical estimates of Kenya's terms of trade.

Chapter 7 examines the role of domestic policies on incentives and observed export performances. A range of macro-price policies have discriminated against exports. The study draws attention to the effects of policy on the

composition of output, relative prices, and the distribution of income. Using the Policy Analysis Matrix (PAM), the study estimates the impact of current domestic polices on production incentives in Kenya. Chapter 8 provides a summary of the study.

CHAPTER 2

EXPORT-LED DEVELOPMENT

The role of exports in economic growth has been the subject of many empirical and theoretical studies. Most studies conclude that exports are a major component of any successful long-term development strategy. Studies emphasize the positive contribution of export activities to income via economic rents accruing to the factors of production (Pearson and Cownie, 1974). Successful export strategies have included a rapid growth of traditional exports and also diversification into other commodities. Countries that have had the highest growth of per capita income have maintained a higher export/GNP ratio in the process of development.

Despite such empirical evidence, some economists argue that export-led development is biased in favor of industrialized countries, inhibits development of poorer nations, and further accentuates international inequalities. Disenchantment with foreign trade and export expansion has led to the alternative development strategy of protecting domestic economies from international markets. Such a view calls for inward-looking policies that emphasize self-sufficiency in agricultural and manufactured goods.

This chapter begins with a discussion of international trade models. Advocates of classical trade theory argue that it is applicable to all countries. The contribution of an

export-led development strategy to economic growth and the determinants of trade and production patterns are the key issues emphasized in trade models. The next section examines criticisms of an export strategy. Some of the main issues include the deteriorating terms of trade and price instability in international commodity markets. Throughout the chapter, empirical studies are cited to provide further insight into the issues discussed.

Trade Theory

Classical trade theory analyzes potential economic gains that arise from production cost differences among countries. The principle of comparative advantage states that countries should specialize in those products that are produced at the lowest relative cost. The simplest version of the theory is static, using the assumptions of two countries, two factors of production, and two commodities. Trade takes place under conditions of perfect competition in domestic and international markets, and domestic factors are mobile internally but not internationally.

Trade is determined by relative factor productivities. Under constant returns to scale, production costs are independent of output levels. Each sector utilizes one of the factors of production relatively intensively. Internal labor mobility ensures that the same wage is obtained in each sector and so the relative price of the commodities

will equal the ratio of unit labor coefficients. A country has comparative advantage in the production of commodity 1 if the relative output/factor ratio is as follows:

$$\frac{aL_1}{aL_2} < \frac{a^*L_1}{a^*L_2}$$

aL_1 and aL_2 are the labor requirements per unit of output, and the asterisk represents the variables in the foreign country. The home country will export commodity 1 and import commodity 2 (Jones and Kenen, 1984).

Extensions of the static Ricardian model add capital, other non-produced inputs, more than two commodities, and include trade between many countries. Most studies indicate that countries benefit from trade because exports allow the country to buy imports on more favorable terms than if the imports had to be produced at home. Trade enables countries to consume in excess of their own production possibilities. Total returns to factors of production therefore must rise with trade. Dynamic benefits also may occur, allowing countries to overcome diseconomies of small markets and enhancing the rate of innovation in production activities. Trading opportunities available to a country do not require that international prices be equal to the trade partner's costs. Trading with distorted foreign economies thus is included in the theory of comparative advantage.

An alternative explanation of trade patterns is provided by the Heckscher-Ohlin-Samuelson model (HOS). The model acknowledges the existence of differences in factor supplies among countries, and differences between commodities in the intensities with which they use these factors. Each country tends to export the commodity that uses its factors intensively. For example, countries that have abundant labor supplies will produce commodities that are labor-intensive and compensate for their scarce capital resources by exchanging exports for capital-intensive imports from other countries. Another implication of the HOS model relevant for developing countries is contained in the Rybczynski theorem. This states that if commodity prices are constant, an increase in factor supply will cause an expansion of the sector which uses the factor more intensively. Therefore, for a small open economy that faces world prices determined externally, an increase in labor supply should result in increased exports which are labor-intensive (Bliss, 1988).

The "vent for surplus" explanation of trade shows gains that arise as international markets create opportunities to utilize domestic factors previously unemployed. The opportunity for trade arises because of new markets or because of reductions in transport costs. The model assumes that all necessary factors, such as land and labor, are in

surplus.

The staple theory developed by Watkins is a fourth export model. An expansion of the primary export sector induces higher rates of growth and per capita income. The export sector propels the rest of the economy along with its growth. The impact of the staple export depends on the technology of the export industry, which establishes linkages with the rest of the economy through demand for intermediate goods and infrastructure (Meir, 1989).

New trade models provide an analysis of trade patterns under imperfect competition. A model of import protection as a means of export promotion developed by Krugman provides a theoretical justification for policy intervention. The model focuses on international trade with oligopolistic producers and uses an example of two firms that compete in each others' domestic markets. The model assumes economies of size are present so that an increase in production reduces marginal costs. Import protection allows the domestic firm a greater share of the domestic market, increases gains from economies of size, and hence encourages competitiveness in international markets. By limiting market access for the foreign firm, foreign costs of production are increased and the domestic firm's competitive position improves even more. However, such a model assumes large domestic markets and a high level of efficiency that is absent among firms in most

developing countries. Even for those countries with large domestic markets, empirical evidence has shown that substantial losses have resulted from a protectionist strategy (Bliss, 1988).

Exports can lead to increases in incomes, domestic savings, and foreign exchange reserves. By producing goods with relatively lower costs and importing goods that would entail higher costs if domestically produced, countries earn higher incomes. They save the difference between potential domestic and world prices on imports and gain (from abroad) the price differences on exports.

Trade also influences the choice of technology and the commodity composition of domestic production, affecting the distribution of income and employment levels. The levels of profits, rents, wages and other factor prices thus varies with the development strategy. Most country studies show that production of labor-intensive exports such as textiles and food crops has increased employment rates and real wages. On the other hand, subsidization of capital promotes capital-intensive activities that are often ill-suited to the domestic economy. Under such a strategy, fewer jobs per unit of output is the likely result (Krueger, 1983).

Export firms may be able to realize economies of scale and increased capacity utilization of capital equipment by producing for larger world markets. Trade induces industries

to keep up with modern technology in order to maintain or improve their market shares. Since firms face price and quality competition in international markets they tend to be more efficient. The small sizes of most national markets often results in less domestic competition (Balassa, 1989a).

Export industries also contribute to the economy via demand and supply linkages to other sectors of the economy. Outputs from export industries may be used as inputs in other sectors. The growth of the export sector encourages demand for skilled labor as new methods of production and organization develop. These skills then can be transmitted to other sectors of the economy. The higher the growth rate of the export sector, the greater the impact on employment and income levels, and the more substantial the linkages with the rest of the economy.

Critics of Export-Led Development

Theories of unequal exchange and international inequality state that there is a systematic bias in international trade. Marxist theorists argue that inconsistencies arise because of unequal ownership of productive assets; labor and capital markets are imperfect whereas commodity markets are competitive. They point to the historical role of colonialism and trade as having confined production in developing countries to mineral and agricultural products. Further, a transfer of re-investable

surplus from low wage developing countries to the high wage industrial countries occurs in the trade process. Trade favors those countries already well endowed, causing greater income inequality and differences in levels of development between countries (Bardhan, 1984).

Dependency theories, originating largely from Latin American economists, assert that capitalist development has been the cause of underdevelopment. Exploitation via trade arises because technologically advanced export sectors are dominated by transnational corporations. Large income flows abroad arise from profits repatriated by foreign corporations and do not stimulate domestic economies. Without trade, developing countries would attain higher savings and economic growth rates. The dependency theorists advocate delinking of domestic economies as the alternative to international trade. Development strategies that increase self-sufficiency are needed to break the vicious cycle of underdevelopment (Balassa, 1989b).

The critics of traditional trade models argue that such models are inapplicable in a world beset by imperfect competition and other constraints, such as protective policies. Anti-trade theorists argue that market forces cannot be relied on to bring about equality in remuneration to factors of production. Prices are ineffective in allocating resources. Price changes make little difference

in patterns of production due to supply and demand inelasticities. International trade based on free market prices therefore encourages inequality in income distribution.

In general, the conclusions of anti-trade critics are that reliance on government planning and market intervention are necessary to promote development. They question the applicability of classical theory, and hence the usefulness of free markets in international trade. Domestic economies should be isolated via protectionist policies from outside disruptive economic forces that slow economic growth and hinder the achievement of government objectives. Policies to promote domestic industrialization via import substitution and self-sufficiency are the appropriate development strategies.

The Infant Industry Argument

The infant industry argument is one of the earliest criticisms against free trade. Temporary protection is given to a new domestic industry via import quotas or tariffs. Initial costs of production and output prices will be higher than world market prices. But over time, learning effects allow the domestic firm to realize economies of scale and reduce production costs. Then the domestic industry will be able to compete in world markets and can earn foreign exchange from manufactured exports. Other benefits result

for the rest of the economy from technological externalities and improved quality of inputs. These effects further stimulate production of manufactured exports. The economy also benefits from the creation of a skilled labor force, greater savings, and capital accumulation for future growth.

To facilitate setting up the industry, cheap imports of capital goods and intermediate goods are necessary. This can be achieved by using an overvalued exchange rate that artificially lowers the cost of imported inputs (for protected industries). An overvalued exchange rate reduces the use of domestic raw materials since there an incentive to use imported inputs.

The infant industry strategy has not been successful in increasing manufactured exports. Most evidence suggests that the pursuit of import-substitution polices accompanied by high protection rates has not led to a substantial increase of manufactured exports in most developing countries. Rather, it has contributed to a decline in their world market shares, inefficient resource use and insufficient technological change (Balassa, 1988).

Most protected industries have been unable to realize economies of scale and have remained uncompetitive in world markets. Linkages with the rest of the economy are usually poor since the distortion of output and input prices adversely affects other domestic industries. Output prices

of the protected industries have remained substantially higher than world prices. Domestic producers purchasing these outputs as inputs are penalized. Infant industry protection therefore slows the rate at which forward-linked industries can develop. The market power of sellers has provided little incentive for catering to user needs. Backward integration is encouraged as producers undertake the manufacture of parts to minimize supply delays. Economies of scale in production of inputs are forgone (Balassa, 1989b).

Maintaining low interest rates as domestic incentives to promote local industries reduces savings due to low returns on capital and encourages self-finance. Artificially low interest rates also necessitate credit rationing that favors import substituting industries. Cheaper capital discourages use of labor and reduces employment levels through a shift to capital-intensive production patterns.

Terms of Trade

Deteriorating terms of trade is one of the major criticisms against a trade oriented strategy. The theory was developed during the post-World War II period by Prebisch and Singer in 1950. The theory states that the terms at which developing countries exchange export commodities for manufactured imports have shown a tendency to deteriorate over time. Prebisch used the net barter terms of trade

measure to support the theory and studied the British terms of trade between 1870 and the 1930s (Meir, 1989).

The net barter terms of trade (NBTT) is defined as the price of exports relative to the price of imports. The measure is calculated by dividing the price index of commodity exports by the price index of manufactured imports.

$$NBTT = \frac{P_C}{P_M}$$

Where P_c and P_m refer to the price index for commodity exports and manufacturing imports, respectively.

If export prices are rising relative to import prices, the country gains from international trade by obtaining more goods for the same quantity of foreign exchange earned through its exports. A lower export price index implies commodity prices are falling relative to import prices. The country needs more exports to maintain the same level of imports. The change in the terms of trade is either favorable or unfavorable according to whether the change in the index of export prices is higher or lower than the change in the index of import prices.

The theory of deteriorating terms of trade argues that in developed countries, increases in labor productivity are

reflected in higher incomes and prices. This is due to oligopolistic pricing practices by employers, and organized labor unions that prevent prices from falling as productivity rises. In developing countries, increases in labor productivity are reflected in lower prices and incomes due to competition in the markets, and the absence of strong labor unions. Therefore, as productivity increases, the net barter terms of trade for primary products deteriorates. The benefits of technical change in developing countries are passed on to the developed countries (Spraos, 1983).

Further deterioration in the terms of trade is enhanced by low income and price elasticities of demand for primary exports. As incomes increase, people spend a smaller proportion of their income on foodstuffs and other agricultural goods, causing only slow increases in the demand for primary exports (Engel's law). In addition, changes in technology have enabled industries to use less raw materials as intermediate inputs. The invention of synthetic substitutes for raw materials further contributes to the decline of demand for their export commodities. For example, demand for pyrethrum exports fell continuously throughout the 1970s due to competition from synthetic substitutes. Likewise, demand for natural fibers like jute, cotton, and sisal has declined over time.

An alternative explanation of the declining terms of trade was provided by Arthur Lewis. He used the Ricardian model in an analysis of North-South trade. The developing countries produce tropical exports and food crops. Developed countries produce manufactured goods and temperate food crops. International prices of tropical exports are determined by their opportunity cost in producing food in the tropical economy. As long as land and labor productivity in producing food is low, the benefits of export production will be captured by the importing countries in form of lower import prices. The only way tropical exporting countries can improve their terms of trade (and also raise producer incomes) is to raise the productivity of land and labor in food production (Lewis, 1988).

In general, declining terms of trade have been difficult to confirm because of problems associated with its calculation and the reliability of data. Prebisch used Britain's import unit value index to represent prices for primary products. The export index represented prices of manufactured goods. These price indices conceal heterogeneous price movements within and among a broad category of foodstuffs, raw materials and minerals.

A common problem with index numbers is how to combine the relative changes in prices of various commodities into a single price index that can be meaningfully interpreted as

the measure of the change in the general price level (Allen, 1975; Meir, 1989). Furthermore, price indices should be adjusted for reductions in transport costs. When freight and insurance costs are a large proportion of the CIF unit value, import values will suggest deteriorating terms of trade relative to exports, which are measured at FOB values without any cost adjustments. An appropriate measure is the ratio of FOB export unit values to CIF import unit values adjusted for reductions in transport costs.

The analysis of the terms of trade over the long-run is also subject to error because results are affected by the choice of initial and terminal years. In his study, Singer cited data for the post-1950s period, with the exclusion of petroleum prices after 1973. Since 1950 was a year of high prices for primary commodities, estimates of the change in terms of trade were biased toward negative values.

Quality improvements due to technological progress and the introduction of new products results in an upward bias in the unit value index for manufactured goods. The terms of trade indices therefore have a qualitative bias which tends to overstate the deterioration of commodity export prices, unless the import unit values are corrected for an increase in quality.

Quality adjustments often are limited to manufactured goods, and primary goods do not lend themselves to quality

changes (Jabara, 1980; Balassa, 1989a). However, Spraos (1980) has argued that the composition of primary exports also changes over time, with higher quality varieties replacing lower quality ones. For example, the proportion of high quality coffee beans (AA) harvested in Kenya was 0.2 percent in 1957/58 but rose to 16.3 percent in 1964/65; a third of the iron ore exported world wide in the 1950s had an Fe content of more than 60 percent, but by 1964 more than half of total world exports had attained the same Fe content level; the processing of cocoa beans into butter or paste is also an example of quality improvement. Commodity price indices should therefore be constructed on the basis of prices for specific grades of commodities. Quality adjustments should be allowed in the unit value indices of both primary and manufactured products. Spraos concludes that this would eliminate the assumption of a systematic bias on the terms of trade from quality changes.

Some studies have indicated that estimates of terms of trade differ depending on the unit of measurement used. To estimate the net barter terms of trade (NBTT) between developed and developing countries, a study by Kravis and Lipsey calculated the price index for manufactured goods. It showed a price increase of 127 percent between 1953 and 1977, compared to an increase of 162 percent indicated by the United Nations unit value index. Deflating the price

index for manufactured goods by the UN price index for primary exports, the NBTT of manufactured goods declined by 6 percent. This result contrasts with an increase of 13 percent when the UN unit value index was used (Balassa, 1988).

The unit value bias is more evident when the unit value index is derived as a ratio of value to weight. An upward bias is introduced due to a shift from heavier to lighter materials in manufacturing goods. This is especially relevant to machinery and transport equipment where quality changes, as well as the shift from steel to aluminum and then to plastics, have raised the ratio of value to weight over time. Since adjustments for changes in quality and the composition of imports are arbitrary, some analysts argue that the terms of trade results are suspect.

When a country expands output through increased productivity, price declines will have less impact on its export earnings. Through increased productivity, a country can improve competitiveness of its exports. Gains from trade will depend on relative costs, not relative prices, and countries gain by reducing real production costs. Since higher productivity reduces export prices, the NBTT index will decline. But the deteriorating NBTT may not be causing a reduction of real income.

To illustrate the limitation of the NBTT measure, suppose import prices increase by 20 percent while export prices rise by 10 percent. The NBTT index will show some improvement, but it will take an increase of 10 percent in the volume of exports to pay for the same volume of imports. However, if productivity rose by 10 percent, the increase in export volume can be achieved without increasing production inputs.

Inferences about changes in productivity and its effect on the terms of trade can be made by measuring the changes in the factoral terms of trade. This would provide a better measure than the NBTT (Devons, 1954). The single factoral terms of trade (SFTT) is the net barter terms of trade adjusted for productivity growth in a country's export sector. This measures the amount of imports that can be purchased by a unit of a factor of production employed in the export sector. It therefore shows a country's gain from trade in terms of "real" factor costs.

The SFTT index is given by:

$$SFTT = \frac{P_C A_C}{P_M}$$

Where P_c and P_m refer to the price index for commodity exports and manufacturing imports, respectively, and A_c is the productivity index of factors used in the production of

commodity exports. Productivity growth can offset the negative impact of price declines on producer incomes. In a favorable price environment, it magnifies the gains from movements in the net barter terms of trade.

The double factoral terms of trade (DFTT) refers to the ratio between the net barter terms of trade and changes in productivity in a country's export sector compared to that of the foreign country producing its imports. The measure therefore takes into account productivity change in both imports and exports.

The DFTT index is given by:

$$DFTT = \frac{P_C A_C}{P_M A_M}$$

Where P_m and A_m refers to the price and productivity index of manufactured imports from developed countries. P_c and A_c represent the price and productivity indices for primary commodity exports.

The income terms of trade is the net barter terms of trade adjusted for export volume. This measure gives the imports obtainable from a country's export earnings (the import purchasing power of exports).

The ITT index is given by:

$$ITT = \frac{P_C Q_C}{P_M}$$

Where Q_c is the volume index of commodity exports.

If the world price for a country's export increases (or the import price decreases) real income will rise and the ITT will improve. Alternatively, an increase in costs of producing exports reduces the export volume and results in a decline of the ITT. A calculation of the NBTT measure under similar circumstances would indicate an improvement in the terms of trade in both cases. The ITT measure is therefore useful because it considers the effects of price movements on the volume of trade (for both exports and imports) as well as the changes in real income (Dorrance, 1960).

The export volume index is not easily estimated. Most developing countries have only a small share of the world market and export prices are externally determined. Export producer prices also are influenced by domestic variables such as the foreign exchange rate and commodity taxes. Export supply functions thus are needed in order to determine the role of external and internal influences on observed export performance (Svedberg, 1980).

Evidence of deteriorating terms of trade over long

periods has not been supported by most empirical studies. A study by Svedberg (1980) estimated changes in the net barter terms of trade, the income terms of trade, and export composition for 33 sub-Saharan African (SSA) countries over two periods, 1950-1969 and 1970-1985. The effect of changes in the net barter terms of trade and the export volume on export performance varied. However, the main differences among countries was due to the varying growth of export volumes. Over 1950-1969, 27 countries experienced significant increases in their export revenues due to export volume expansion. But from 1970-1985, about two-thirds of the countries experienced stagnating or declining export volumes. In both periods (with the exception of oil exporters) the barter terms of trade for most countries remained the same or deteriorated. As a group, SSA countries failed to maintain export market shares in the stagnating primary commodity world markets (coffee, cocoa, cotton, sugar and copper). Export revenues fell as shares in the world markets declined from 7 percent before the 1970s to 4 percent between 1970-85. The study concludes that failure to maintain output levels after the 1970s rather than changes in the barter terms of trade were most responsible for declines in export earnings.

Many analysts consider the factoral measures as the most useful concepts in measuring the gains from

international trade. The export sector may increase productivity, causing a positive change in income. The net barter terms of trade would show a decline. This result is not an indication of poor economic performance as long as productivity increases offset falling export prices. Still, many empirical studies have tended to focus on the NBTT measure. The frequent use of the NBTT may be attributed to the ease with which results are calculated and also a lack of sufficient data, especially for productivity and export volumes, with which to calculate the factoral measures.

Price Instability in World Commodity Markets

Instability of export prices in the world commodity markets has been a major concern for policymakers in developing countries. Most countries have small export market shares and cannot influence prices in the world markets. They are also heavily dependent on their foreign exchange earnings to obtain important intermediate inputs and capital goods. Price instability thus can have significant impacts on of their economies.

Export taxes account for a significant proportion of government revenue. Commodity price booms generate high income growth and increases in government expenditure, resulting in a demand-pull type inflation. If the boom is followed by a market slump, governments may resort to inflationary deficit-financing to maintain spending. In

addition, import restrictions usually are instituted in an attempt to correct balance of payments deficits. These often create domestic supply bottlenecks and further increase domestic price levels. The above pattern may be especially common among countries that depend on a few primary exports or that have high ratios of exports/GNP.

Commodity price instability is affected by the price elasticity of supply and demand for exports. The more inelastic the supply and demand curves, and the larger the shifts in supply and demand, the greater the price fluctuations. Demand for directly consumable primary exports is price inelastic because most commodity exports (such as food crops and beverages) have few substitutes. They also form a small part of consumer budgets and have low income elasticities. Derived demand for processed commodities is often inelastic because of the minor importance of raw material in the cost of the final products. For example, part of the demand for natural rubber depends on cars, whose production is unlikely to vary much in response to changes in rubber prices.

Price elasticity of supply for most agricultural exports is low due to the difficulty in varying output levels in the short term. For example, annual crops are planted in the previous year so output change is only possible by changing harvesting techniques or input use. For

many permanent crops, current production is dependent on plantings done much earlier. This creates a long production lag before the output gets to the market. Also, output prices may fall considerably and still cover variable costs such as harvesting costs. Due to these inherent features in the production of primary exports, producers tend to maintain supply for long periods at low prices before a substantial price response. In the absence of an agreement between exporters that limits export growth, surpluses in the world markets are a frequent occurrence.

Supply shifts are affected by weather conditions and changing government policies. For example, the depression of mineral prices in the 1970s and 1980s (the worst since the 1930s), has been attributed largely to the change of ownership of mining companies from private corporations to national governments. Production decisions and the control over rents from the mineral resources shifted to government. Unlike the mining firms, governments have resisted reductions in production, even during periods of low prices because of its effects on export revenues and employment. As a result of continued increases in supply, prices have declined considerably (Macbean and Nguyen, 1987).

Some analysts argue that even when export prices are unstable, a country can still experience a stable flow of export earnings provided that its export bundle is comprised

of several commodities. Offsetting price fluctuations in various commodity markets would help to stabilise earnings. However, most countries derive over 50 percent of their earnings from three or fewer export commodities. The geographic concentration of export markets can also affect instability. The more dispersed are exports over markets, the more stable are earnings, because of the offsetting variability among consuming countries. Most developing country exports are concentrated in a small number of foreign markets (Athukorala and Huynh, 1987).

A study by Macbean concludes that price instability of primary exports from developing countries is smaller than previously assumed. Supply variations are more important causes of instability than demand factors. Therefore, export earnings are greater than or less than price fluctuations depending on whether or not domestic output levels move with or against international prices. Another study indicates that, with the exception of oil exporting countries, there have been no significant differences in export instability between developed and developing countries. Protectionist countries appear to experience greater instability than those pursuing an export-led strategy, suggesting that export instability partly reflects internal policies (Svedberg, 1980; Krueger, 1984).

In summary, analysts differ as to whether export

prices, total export earnings, or the purchasing power of exports should be the focus in analyzing the effects of commodity price instability. Most studies reveal the following trends: price fluctuations can be substantial in both manufactured and primary exports; greater commodity concentration results in increased fluctuations of export earnings; and export volume fluctuations have been the dominant source of export earning instability.

One proposal to solve the problem of price instability has been the International Commodity Agreements (ICA). During the 1950s and 1960s, the need to stabilize export prices of primary commodities was emphasized at international economic forums and led to the formation of many of the existing commodity agreements, such as the International Coffee Agreement and the International Rubber Agreement.

The experiences of the 1970s highlighted the problems of commodity price instability. A commodity boom in 1972-1973, followed by a market slump in 1974-1975 and the increases in oil prices, caused large increases in foreign debt, especially for importing countries. These events led to renewed interest and proposals for more integrated commodity programs and common fund schemes.

The aim of international commodity agreements is to stabilize prices for member countries. It is hoped that

members can increase their export earnings via the agreements. To achieve these aims, ICA's restrict output, usually through the use of a quota system and buffer stocks. However, production cutbacks are difficult to sustain because members must be willing to produce well below their capacity. The differences in elasticities of demand for the group and for the individual exporter creates an incentive to cheat on the allocated quotas. This has been a principal reason that most agreements have failed to function as intended.

The cartel is more successful if there are no close substitutes for the commodity. But there are very few commodities that cannot be substituted easily. Higher prices eventually prompt consumers to develop new alternatives. Most primary exports are nondurable and storage is expensive and difficult. Such costs, in addition to other administrative costs, often outweigh the benefits from agreements.

To be successful, commodity agreements need to forecast correctly the long-term trend in market prices and adjust intervention prices accordingly so as to stabilize prices. Often, the failure to adjust to changes in supply and demand leads to resource misallocation and unstable prices. Quotas can be set too high or too low, and the managing authority may run out of buffer funds or buffer stocks. When a change

in the market price is misinterpreted as being short-term, price control through the use of stockpiling becomes costly and ultimately ineffective in raising prices over the long-run.

Analysts suggest that apart from stabilizing a country's foreign receipts through existing and proposed compensatory financing schemes, countries should increase their efforts at stabilizing their internal policies. Most empirical evidence confirms the views that the instability of domestic prices and quantity form the predominant source of export earning instability (Macbean and Nguyen, 1987).

Conclusion

International trade offers many potential benefits to countries. Exporting countries can overcome the limitations of small domestic markets by exploiting economies of scale. Trade increases technological skills, import capacity, incomes and employment, especially since most commodity exports are more labor-intensive than import-competing goods. Policies pursued under an export-led strategy promote more efficient resource use and consequently promote growth. Empirical evidence has shown that anti-trade policies often result in a lagging export sector, reduce foreign exchange earnings, and slow the rate of economic development.

Terms of trade measures can be useful indicators for economic planners. However, results depend on the choice of the unit of measure, changes in transportation costs and the time period considered. Of even more significance is the effect of quality changes in the unit value indices, which overstates the deterioration of primary exports against manufactured goods. These factors suggest that most results are biased and therefore inadequate for confirming a deteriorating trend in primary commodity prices.

CHAPTER 3

THE WORLD TEA MARKET AND TEA PRODUCTION IN KENYA

Price instability in commodity markets is often used as an argument against trade. Fluctuations in prices result in large changes in export earnings which affects national incomes and the rate of development. Different studies reveal varying trends in commodity markets. This chapter examines some of the factors that affect prices in the world tea market, including the role of tea quality.

In terms of value, tea ranks below other beverages such as coffee and cocoa. However, it is consumed worldwide and is an important source of foreign exchange earnings for many countries. Most tea production and exports comes from Asia and Africa. Production has increased in most countries over the past decade. However, the rate of export growth has been much slower, mainly due to low growth of consumption rates.

An analysis of world demand shows the factors that have influenced consumption and their implications for export growth. World tea prices have declined gradually since the 1950s, but they have been relatively stable because the world market is less susceptible to fluctuations in supply. The chapter also discusses future market projections of the world tea trade.

Kenya has become a major world exporter. Its share of world exports was 12 percent in 1990-1991. Tea exports account for about 20 percent of Kenya's export earnings. Exports are an important source of income growth. A discussion of tea production and marketing systems in Kenya is presented. The contribution of small holders, who contribute the bulk of total tea exports, is emphasized in the discussion.

Market Supply

Tea grows in well drained, slightly acidic soils in wet subtropical and tropical areas. Three major varieties, China, Assam, and Cambodia are grown worldwide, but there are many other hybrids. Distinctions result from plant types and environmental conditions like climate, elevation, and soil type. Tea reaches full bearing about the tenth year after planting. Tea leaves are plucked continually during active growing seasons. Processing of harvested tea should be started within four hours after leaf plucking. Factories must be near the growing areas to avoid weight and quality loss.

Tea production was dominated initially by plantations. Substantial cost savings (such as with freight rates and storage facilities) resulted from the vertical integration

of production units under the plantation system. Plantations still contribute significantly to the world supply. However, in many countries, such as Kenya, production patterns have changed as a result of vigorous government programs to promote smallholder tea growing.

Since the early 1950s, the world tea market has been characterized by a rapid growth in production levels (Table 3.1). The growth rate of world production averages 3.3 per cent a year. Increased yields have been the main factor behind high production growth rates. Yield increases are achieved by more intensive cultivation, planting more tea bushes per acre, the introduction of high yielding varieties, and increasing use of modern inputs like fertilizers (Sakar, 1972).

India is the leading world producer, consumer and exporter. India accounted for about 40 percent of total world tea production in 1963, but by 1989 this figure had declined to about 28 percent. Despite a substantial decline in exports, India still plays an important role in the world market. China dominates the world market for green tea and is also a major supplier for black tea. Some major producers like Sri Lanka have experienced declines in production levels (Tables 3.2 - 3.3).

TABLE 3.1

WORLD TEA PRODUCTION

('000 mt)

	1987	1988	1989	1990	1991
INDIA	665	701	684	715	723
SRI LANKA	214	228	207	233	232
INDONESIA	126	129	159	149	158
CHINA	508	545	534	562	570
KENYA	155	164	186	197	200

Sources: International Tea Committee. *Annual Bulletin of Statistics*, London: ITC, various issues.
Food and Agricultural Organization. *Production Yearbook*, Rome: FAO, various years.

TABLE 3.2

WORLD TEA PRODUCTION

	% Share of Total Production			Growth rates (%)
	1987	1988	1989	1961-86
INDIA	28.4	28.4	27.9	2.6
SRI LANKA	9.1	9.2	8.5	-0.4
CHINA	21.7	22.0	21.8	6.0
KENYA	6.6	6.6	7.6	10.0
INDONESIA	5.4	5.2	6.2	4.0

Source: Food and Agricultural Organization, *Production Yearbook*, Rome: FAO, various years.

TABLE 3.3

WORLD TEA EXPORTS

	EXPORTS ('000 mt)					GROWTH RATES (% per annum)
	1987	1988	1989	1990	1991	1961-1986
INDIA	203	201	198	209	201	0.1
SRI LANKA	207	200	219	203	216	-0.5
INDONESIA	78	90	92	114	111	4.5
CHINA	172	174	206	212	201	6.0
KENYA	116	134	155	163	160	9.6

Sources: International Tea Committee. *Annual Bulletin of Statistics*, London: ITC, various issues.
Food and Agricultural Organization. *Trade Yearbook*, Rome: FAO, various years.
The World Bank. *Commodity Trade and Price Trends*. Baltimore: The John Hopkins University Press. various years.

Africa has rapidly expanded its production due to favorable growing conditions, relatively low costs, and increases in productivity. Between 1961-1986, Kenya had the world's highest production growth rate -- 10 percent-- and is currently the fourth largest producer in the world. Others, like Uganda and Tanzania, have had difficulty in increasing tea production and exports. This is mainly due to low productivity and the failure to adopt more export-oriented policies (World Bank, 1989a).

Tea production is price inelastic. A long production lag of about six years means that by the time bushes come into full bearing, the increase in supply may exceed that called for by the initial price increase. Producers continue to pluck tea when tea prices are low because variable costs are a small portion of the overall cost of production. A price decline will not normally lead to an uprooting of yielding tea plants. Tea bushes are neglected only after they get very old or if world prices fall drastically for a prolonged period of time. Some price response is possible by varying input use and plucking practices. Output may be decreased by "finer" plucking during periods of low prices. (Sakar, 1972; Athukorala and Huynh, 1987).

World Demand

Demand for tea depends on income levels, consumer habits, and the size, age and composition of population. Demand may also depend on competition from other beverages. But changes in coffee prices, tea's closest substitute, seem not to be important unless the price is abnormally high. Habitual tea drinkers prefer tea to other beverages. They also have a well defined preference for certain types of tea that seems to vary little with price changes or income levels. Price elasticity of demand thus is low. Such factors imply that demand is fairly stable and changes only slowly (Sakar, 1972).

Developed countries account for about three-fifths of world tea imports. In the predominantly tea drinking countries, per capita consumption is near the saturation point and total consumption is unlikely to increase very much. Imports by developed countries have not been responsive to changes in incomes or prices. Reductions in tea prices due to lower import duties and other taxes has not affected consumption levels.

The United Kingdom is the largest importer, but imports have dropped as per capita tea consumption declines.

In 1988, per capita consumption was 2.8 kg, compared to 4.4 kg in 1963. The decline in demand is partly due to competition from soft drinks, fruit juices and herbal teas. The use of tea bags, which are more efficient than loose teas, also has contributed to lower import levels. Per capita consumption also has declined over the past decade in the United States. The increased use of ice teas and herbal teas (they contain smaller amounts of tea) is one trend contributing to lower import demand.

In developing countries, consumption has expanded rapidly, averaging about 5 percent a year. The import share for developing countries is over 40 percent of total trade. Price and income elasticities of demand are relatively high. The prospects are good to increase tea exports to these countries.

The Middle East has become a major market. Growth was especially large during the 1970s and early 1980s, when large increases in demand were made possible by high oil prices. North Africa represents one of the largest tea consuming regions (World Bank, 1989). Rapid population growth rates create the potential for even larger domestic markets. However, tea imports depend on foreign exchange earnings being in ample supply.

World Trade

World exports have been growing less than 2 percent per year. This rate is lower than the production growth rate (3 percent) partly due to the growth of consumption in major exporting countries (India and China). Asia's share of the world market has gradually declined since the 1960s. But Asia's production and export shortfall has been offset by export increases from other producers like Kenya.

Most tea is sold through auctions. Some of the large auction markets are London, Calcutta, Colombia and Mombasa. The London auction price is often used as the reference world price for black tea exports. Auction prices generally reflect prevailing supply and demand conditions. Prices in the various auctions markets generally show similar patterns. Price differences, when they occur, have been due to a lack of coordination, changes in the foreign exchange rate or freight charges, and strikes by dock workers. (Sakar, 1972; Chamlin, 1992).

Tea prices are relatively free from marked seasonal price fluctuations. Sudden price disturbances as a result of supply fluctuations have been less common than in other beverages, such as coffee. This is because tea plucking is

nearly continuous throughout the year, ensuring a steady market supply. Tea supply is also fairly well diversified unlike other beverages, where single countries tend to dominate world production and exports. Finally, well-organized, vertically-integrated plantations have been a factor in dampening year-to-year price fluctuations by ensuring regular supplies to the world market. The lack of speculative stockpiling in tea markets is testimony to the absence of regular large fluctuations in supply or price of tea. Tea prices between 1964 and 1987 declined at a rate of nearly 5 percent per year. An exception to the price declines occurred during 1974 and 1977, when high coffee prices led to an increase of tea prices -- its closest substitute. Tea prices then resumed their downward trend.

Tea prices also vary with stock levels. High prices are associated with low stocks, and vice versa. Price increases in 1983-1984 were partly due to the fact that stocks were below normal. The shortage was compounded by India's restriction on tea exports to meet domestic demand. Prices rose slightly in early 1990 due to a poor Indian crop, but exports recovered quickly and the price increase was short-lived.

Price and Quality

Tea prices reflect environmental conditions, quality of field management, and processing methods. Tea quality is affected by the local climate, soil, cultivation conditions, and altitude. Tea can be either high grown, medium grown or low grown. High grown teas generally grade better, are of a finer flavor, and usually command higher prices on the market.

Classification of tea also is based on the methods of processing. There are two main types of tea -- black tea (90 percent of trade), and green tea. Green tea is manufactured by steaming without fermentation thus retaining some of the green color. Black tea is allowed to ferment before firing. This reduces the astringency of the leaf and is thought to develop the color and aroma of the liquor.

Differences in tea quality and prices also arise from the manufacturing processes. The cut, tear, and crush (CTC) process produces lighter teas commonly used in tea bags and other blends. Such teas are highly favored in developed country markets and command higher prices. The orthodox process yields a darker brew popular in many Middle Eastern countries.

In general, three categories of international tea prices are quoted (Figures 3.1-3.4). The traditional measure of high quality tea was based on Indian and Sri Lankan varieties. However, quality tea from African countries such as Kenya now commands similar prices. Higher prices for Kenyan tea also may occur because export supplies are relatively reliable. High quality or high grown tea is represented by tea from north India, Kenya's high grown or Sri Lanka's high grown. Specialty teas, like Indian Darjeeling tea, also fetch high prices. Medium quality teas include Kenya's and Sri Lanka's medium grown tea, India's medium Assam tea and medium grown tea from Malawi, Indonesia and China. Low grown tea from Bangladesh, Argentina, and Indonesia often receive the lowest market prices. They are used mainly as fillers in the tea bag blends (International Tea Committee, 1988).

Competition for quality tea in the world markets leads to changes in relative prices, known as the concertina effect. During years of ample supply, prices of common or low grown tea often decline more than prices of quality tea because buyers at the world markets increase the use of quality teas. This substitution results in a widening gap between prices of high and low quality tea. Conversely,

when supply is relatively low, substitution favors low quality and the concertina will narrow (Sakar, 1972).

Some studies suggest that the price differential between high and low quality tea prices has declined over time. However, the long-run trend in price differentials is not consistent. This is partly due to a lack of detailed price analyses. Often, quoted prices refer to an average auction price without taking into account quality or other differential factors. Also, few studies include price data from all tea auctions in order to better understand the role of quality differentials in the world market (Sidles, 1992).

Critics of the international market argue that it is not competitive because the bargaining power of sellers and buyers is unequal. They argue that a small number of buyers, blenders and distributors dominate the tea trade. About 80 percent of the international tea trade is controlled by a few multinational firms such as Brooke Bond, Lipton, Twinnings, and Lyons Tetley (Chamlin, 1992; Athukorala and Huynh, 1987). Vertical integration may hinder competition as buyers own many plantations and factories in producing countries with shipping, blending and distributing facilities.

Market Projections

World tea prices are not expected to rise by much over the near future. Trade is projected to increase at 1.6 percent per annum. Based on the World Bank's econometric model, prices are expected to vary between US$ 1.50 per kg to 1.60 per kg by the year 2000. Analysts suggest that unless there are real currency devaluations among producing countries, current price levels are too low to encourage production expansion as rapid as expected growth. Supply shortages caused by bad weather, or increased domestic demand coupled with a low price elasticity of demand may lead to price fluctuations. However, since the price elasticity of supply is fairly low, such fluctuations are expected to stabilize within a year or two around the projected price.

Consumption changes in India may have major effects on the world market. Production is estimated to be 780,000 metric tons in 1995 and 860,000 metric tons in the year 2000. But projected exports by the year 2000 are estimated at only 165,000 metric tons, a decline from normal export levels of 200,000 metric tons. China is an important black tea exporter but its domestic consumers have a preference for green tea. Future export levels will depend on whether

more Chinese tea will be manufactured into black tea for export markets. Analysts project substantial increases in Kenyan exports, from 130,000 metric tons in 1987 to 230,000 metric tons in 2000. These increases will largely offset the declines in Asia's exports. Kenya has the highest expected export growth rate, estimated at 4.5 percent between 1987-2000 (World Bank, 1989a).

Consumption in developed countries is projected to increase slowly. Consumption in the United Kingdom is expected to continue its downward trend (a negative growth rate of -1.3 percent). Demand from Asia, the Middle East, north Africa, and the USSR is likely to increase. Developing countries are expected to form an increasingly important part of market demand. For example, Pakistan's net import growth rate is estimated at 3.3 percent between 1987-2000, and Egypt's is estimated at 3.5 percent.

World tea prices in real terms continue to decline. In the absence of adjustments in production levels, and due to a slow growth in world demand, prices are expected to continue declining. In many countries, policy changes such as currency devaluation, and a reduction of marketing, labor and other production costs is necessary to maintain producer incentives. An improvement in quality also may be important.

Such changes would entail greater investments in research and infrastructure development (shipping facilities, transportation and modern processing factories).

The Role of Tea Agreements

The first attempt at international tea market regulation goes back to the mid-1930s. Since then, there have been a series of unsuccessful attempts to control the tea market. These failures were mainly due to disagreements over export share allocations, a frequent problem in most international commodity agreements. India and Sri Lanka have been strong proponents of an international agreement. They want higher tea prices since their exports are stagnating. Most African exporters have experienced rapid production growth rates and are not interested in agreements that hinder their production trends. Since the 1970s, Kenya has had a strong bargaining position by virtue of higher quality and relatively low production costs. Labor costs in Kenya are less than those for India and Sri Lanka (Stern, 1972).

The prospects for an International Tea Agreement are still remote. An Agreement based on the use of a buffer stock may not be feasible for two reasons. It is inadequate in rectifying the problem of oversupply - the major source of imbalance in the world tea trade since the 1950s.

Second, technical problems are involved in the stocking of tea for more than six months. Yet any agreement would have to include export quotas and substantial storage activity.

Tea Production in Kenya

The promotion of small holder tea production and exports has been the responsibility of the Kenya Tea Development Authority (KTDA). Formed in 1964 with funding from the World Bank and the Commonwealth Development Corporation (CDC), tea planting programs were launched throughout the country. The number of small growers rose from 2,400 in 1964 to over 150,000 in 1991. In 1964, the plantation sector produced 98 percent of total tea output. By the end of 1989, plantation production contributed only 40 percent, whereas 60 percent of the output came from smallholders.

The tea industry is important to rural incomes and as a source of foreign exchange earnings. The value of tea exports as a percentage of total exports rose from 10 percent in 1971 to 20 percent in 1988. Tea is a labor-intensive export crop, averaging about 2,000 hours per acre in a year. In contrast, maize uses about 300 hours. Labor is heavy during planting, becomes lighter for the first 3 years, and then becomes consistently heavy during plucking (Stern, 1972).

KTDA advises smallholder farmers on tea growing, and provides services for purchasing, transport, processing and marketing. About 10-15 percent of total tea production goes to the Kenya Tea Packaging factories (KETEPA) for blending, packing, and distribution in the domestic market. The rest of the tea is exported.

The quality of Kenya's tea has increased over time due to several factors. The use of propagated bushes (propagation involves cuttings from carefully selected bushes or clones) instead of tea seedlings has resulted in higher quality and increased yields. The tea authority also has insisted on plucking standards of two leaves and a bud from the end of the stalk. The average size of tea holdings is between 0.3 and 0.4 hectares. KTDA maintains that as holdings rise above 0.4 hectares, leaf quality declines. Tea plucking is a skilled task and quality is more difficult to maintain on large holdings. Tea estates, for example, produce lower quality tea than smallholders.

The present marketing system has ensured producers of a high proportion of export value. KTDA pays tea growers in two installments. The first payments are made each month for leaf delivered during the preceding month. The second payment, popularly known as the "bonus", is dependent on world tea prices and on the quality of the tea factory's

output. The marketing margins for tea have also declined as production and factory utilization rates increase. For example, in 1971-1972, total costs were 32 percent of the green leaf price; by 1980/1981 costs had declined to 24 percent of the leaf price. These margins may have declined even further in the 1980s and 1990s due to further production increases.

Institutional structure and managerial practices of the KTDA have also played an important role in the success of the tea industry. These include operational autonomy with minimal government intervention. Though control over tea production and distribution is highly centralized, growers' participation in policy making and implementation via elected committees has been encouraged. Growers also can own stocks in individual KTDA tea factories. The KTDA has maintained good communication channels to transmit production policy to the farmers.

Kenya's tea prices in the world market reflect its favorable environmental conditions, quality field management, constant export volumes, and the methods of processing. Rainfall in the major production regions is evenly distributed over the year which ensures continuous tea plucking. Since export supplies are constant, Kenya has an advantage over other world exporters. The proportion of

domestic tea consumption is relatively small compared to other main exporters. Variations in domestic consumption and stock levels thus do not have a substantial effect on exports. All factories use the CTC (crush, tear cut) method which produces lighter teas favored in the world markets.

Most tea is sold on the Mombasa and the London auction markets. The main export markets include the Netherlands, United Kingdom, United States and Canada. Developing country importers also are important export markets. There is potential for larger exports to non-traditional tea markets, but Kenya probably would have to invest in promotion to penetrate these markets.

The rapid growth of the smallholder sector and the lack of funding has made it difficult for KTDA to lay an adequate infrastructure to support production and processing in all growing regions. As a result, delays are long at some buying centers and haulage distances are long to some factories. Exposure of the leaves to dry and hot air can be excessive and weight loss in transit often affects productivity and leaf quality.

The tea estates have maintained higher yields per hectare than smallholders. They have some of the best road networks in the country which minimizes weight loss in

transit and keeps production costs low. The Board argues that the difference in average tea yield per hectare remains higher in the large farms because a high proportion of smallholder tea that has yet to come to full bearing age. Yield increases also are expected due to the infilling programs being undertaken in the smallholder sector. Even so, maintaining future production trends depends on investments in road construction and maintenance, including the construction of additional tea factories to ease congestion.

Conclusion

World tea prices have remained low and demand has declined over the past decade. This trend is expected to continue in the future. To encourage production expansion, exporting countries will have to institute domestic policy changes, such as currency devaluation, to maintain producer profits. The world market is competitive and improvements in export quality also are necessary.

Kenya is expected to keep production and export levels on a growth trend. This would offset the expected export declines from Asian exporters. However, infrastructure developments in the tea industry are needed to reduce production costs and raise producer profits.

FIGURE 3.1: SRI LANKAN AND KENYAN TEA

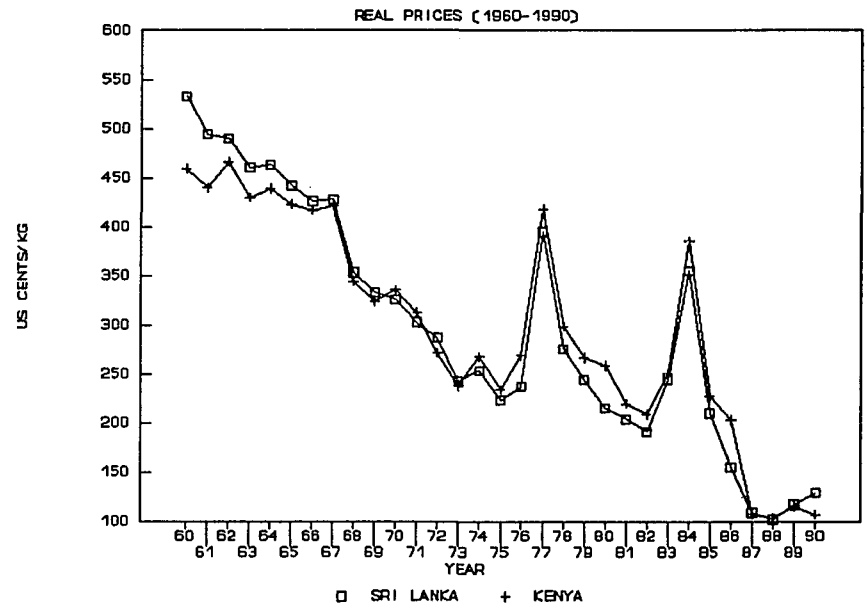


FIGURE 3.2: NORTH INDIAN AND KENYAN TEA

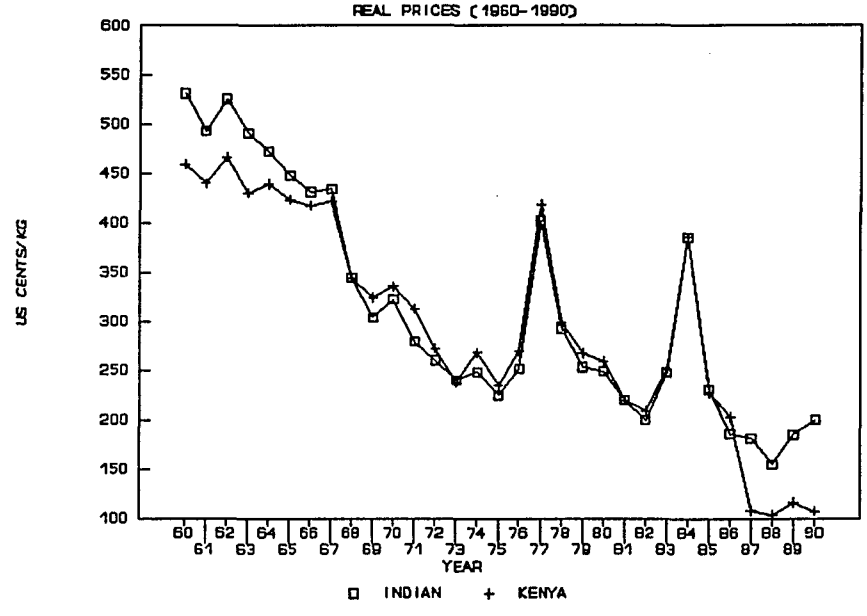
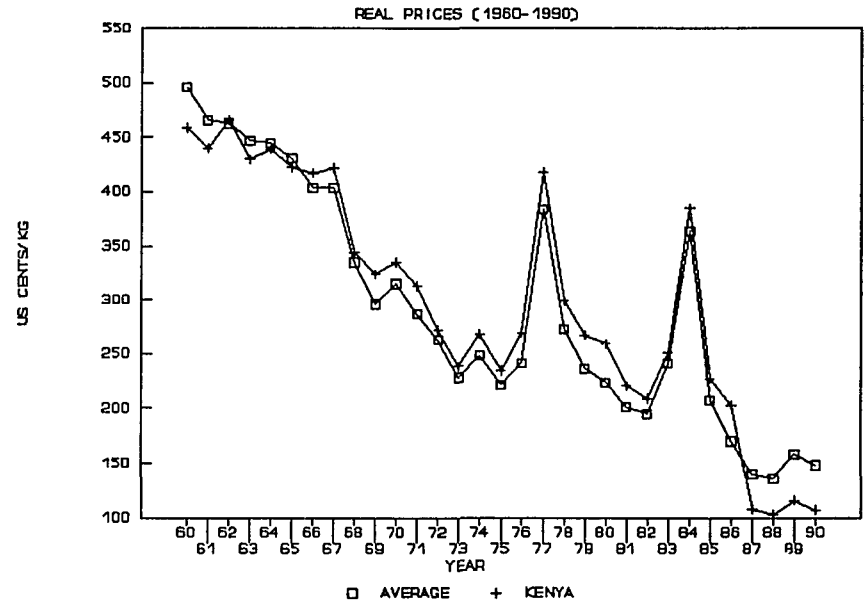


FIGURE 3.3: KENYAN AND AVERAGE TEA



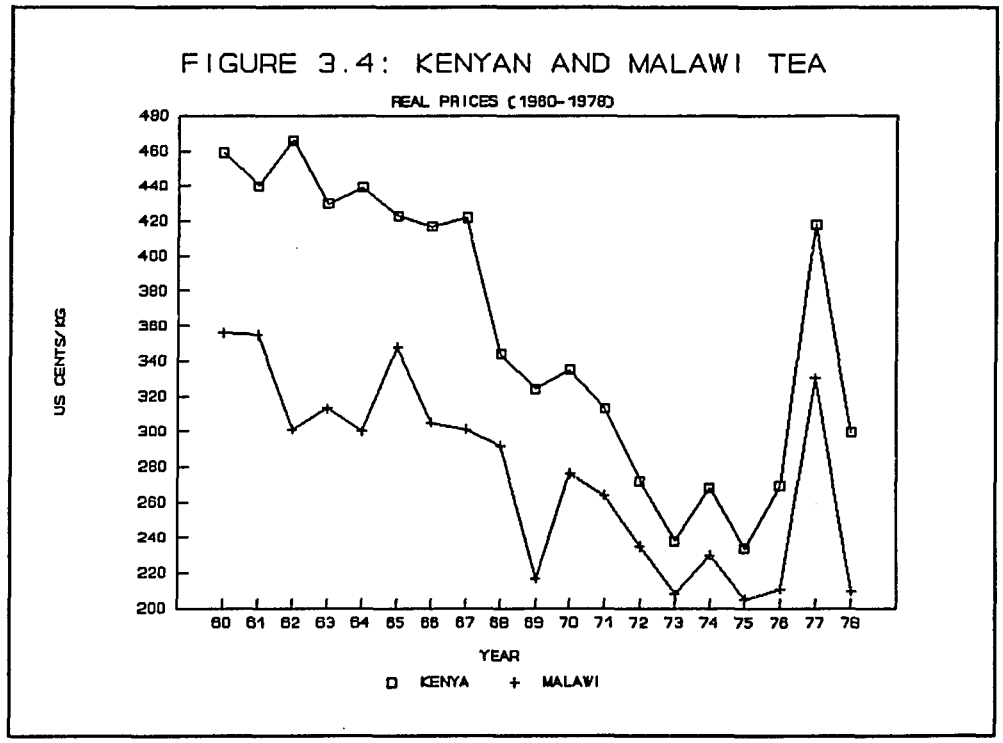


FIGURE 3.4: KENYAN AND MALAWI TEA
REAL PRICES (1980-1978)
US CENTS/KG
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78
YEAR
KENYA
MALAWI

CHAPTER 4

THE WORLD COFFEE MARKET AND COFFEE PRODUCTION IN KENYA

Earnings from coffee contribute more than 25 percent of total export value in nearly three-fourths of exporting countries. Coffee contributes over 50 percent of the total export value in the remaining countries. Before World War II, two-thirds of coffee exports came from Brazil and its large stocks were used to stabilize prices. Despite a declining market share, Brazil's production pattern and export policy still affects prices. World consumption has been declining or is stagnating, partly due to slower income growth and competition from other beverages. This chapter discusses the factors that determine world prices and the future prospects for world coffee exports. Future production is estimated to grow more than world demand and prices are expected to continue falling.

The coffee market has been regulated by an International Coffee Agreement (ICA) between major consumers and producers. The instability of past agreements has become a frequent problem for exporters. The ICAs have not stabilized prices in real terms. Following the suspension of the quota system in July 1989, prices fell by about 30 percent. The future prospects for the agreement remain uncertain.

In Kenya, coffee contributes about 25 percent of the total value of exports. This chapter examines the growth of coffee exports in Kenya. The role of domestic marketing systems and other price policies is also discussed. Such policies affect producer incentives and the quality of future exports.

Market Supply

Latin America has been the dominant coffee producing region. However, its share of world production has declined. At the same time, African and Asian producers have increased their share (Table 4.1). Two coffee species, arabica and robusta, are the most widely grown and traded. During the 1970s, robusta's share of world production more than tripled. By 1980, its share was 25 percent of total world production. Increases in robusta production were influenced by a change in the location of production from Latin America to Africa, where conditions are more suited to robustas. Robustas are hardier and flourish at higher temperatures and lower altitudes (Ivory Coast, Indonesia, Uganda and the Philippines). It also requires simpler production and cheaper processing methods (including lower labor and purchased input use).

TABLE 4.1

WORLD COFFEE PRODUCTION

(000's of 60kg bags)

YEAR.	BRAZIL	COLOMBIA	KENYA	INDONESIA	IVORY COAST
1986	13,900	11,000	1,750	5,900	4,405
1987	38,000	13,000	2,160	5,965	3,103
1988	25,000	10,700	1,960	6,750	3,989
1989	26,000	13,300	1,740	6,900	4,734
1990	31,000	14,000	1,400	6,950	4,000
1991	28,000	14,500	1,600	6,900	4,500

Source: United States Department of Agriculture, Foreign Agricultural Circular. *World Crop Production: Coffee*. Washington, D.C: various years.

Arabica grows best on highlands in the subtropical regions. It can be further classified into Colombian milds (Colombia, Kenya and Tanzania), other milds (Central America and India), and unwashed arabicas (Brazil and Ethiopia). Some countries produce both species, but usually one of the two is the main export (Table 4.2). Research activity has been focused on the development of high yielding varieties resistant to disease, less marked biennial bearing, shorter internodes for ease of harvesting, more even ripening, and increases in the proportion of better quality beans. Emphasis is on the development of hybrids that combine arabica flavor and robusta's resistance to disease.

Climatic factors affect production and prices. Blossoming of coffee flowers requires adequate rainfall, so drought may reduce the development of coffee cherries. Harvesting also is affected by too heavy rains that render the cherries unfit for export. Severe frost reduces growth of the berries.

Coffee output also shows fairly marked fluctuations from year to year due to the biological biennial bearing cycle. A large crop may exhaust the tree and is often followed by a poorer yield. Supply and world prices also vary seasonably. A substantial amount of the world supply is

TABLE 4.2

GREEN COFFEE - EXPORTABLE PRODUCTION

(000's of 60kg bags)

YEAR.	BRAZIL	COLOMBIA	KENYA	INDONESIA	IVORY COAST
86-87	4,900	9,000	1,591	4,950	4,375
87-88	28,000	10,980	1,985	4,915	3,071
88-89	15,500	8,891	1,787	5,478	3,957
89-90	15,500	11,538	1,665	5,575	4,700
90-91	20,000	12,285	1,380	5,570	3,964
91-92	17,000	12,880	1,580	5,350	4,462

Source: United States Department of Agriculture, Foreign Agricultural Circular. *World Crop Production: Coffee*. Washington, D.C: various years.

produced at the same time, causing price declines. Price increases during the non-harvesting periods when output is in relatively short supply.

Coffee output and input prices are influenced by government policy in many countries. The exchange rate, export taxes, production subsidies and domestic investment programs are used widely. In all major producing countries, state agencies or marketing boards have been established. They usually have a monopoly and perform a wide range of duties like marketing, processing, grading and exporting coffee.

Coffee has high fixed costs and low variable costs and the price elasticity of supply is low. Productive maturity is reached 6-7 years after planting, making it difficult to scale-down production when world prices are low. It's also difficult for producers to destroy trees that have taken years to develop. Only occasionally has coffee been destroyed because of low prices. As a result of production rigidities, price declines are sustained for longer periods before a substantial effect on supply occurs.

Brazil is the largest coffee producer and exporter. (Table 4.3). Despite a declining since the 1960s, Brazil's production continues to play a dominant role in the world

TABLE 4.3

WORLD COFFEE EXPORTS

GROWTH RATES (% per annum)

YEAR	1961-70	1970-80
WORLD EXPORTS	1.97	0.60
TOTAL AMERICA	1.05	0.84
BRAZIL	0.89	-3.42
COLOMBIA	1.91	5.40
TOTAL AFRICA	3.65	-2.19
KENYA	5.36	2.88
1VORY COAST	1.81	0.67
TOTAL ASIA	3.13	10.55
INDONESIA	3.53	6.43
INDIA	3.60	12.00

Source: The World Bank. *Commodity Trade and Price Trends*. Baltimore: The John Hopkins University Press. various years.

coffee market. Its production is affected by droughts and severe frosts. Studies have shown that world production parallels Brazil's production pattern; the correlation coefficient between its yearly fluctuations and world production is 0.96. Large changes in world prices thus are usually linked to Brazilian production. For example, a severe frost attack in 1976 and 1977 reduced production to 9.3 million bags and was followed by a rapid rise in world prices. When production rose to 17.5 million bags between 1977 and 1978, prices declined sharply. In 1981, drought aggravated the effects of a frost attack, further reducing Brazil's exports and resulting in high prices (Akiyama, 1982).

Recovery of world prices after declines depends on how quickly Brazilian production recovers from frost attacks. In the recent past, production levels have been raised within a relatively short period. Brazil also has encouraged coffee growers to replant coffee out of the frost prone southern states into the frost free northern regions. This will ensure a more stable world supply in the future and probably will eradicate the dramatic price increases experienced during the 1970s.

World Demand

Consumption of coffee is highly concentrated among the non-producing countries of North America, Europe and Japan. In most importing countries, demand has been growing slowly. Demand responds only slightly to price changes, and the price elasticity of demand for high income countries is estimated at -0.2 to -0.3. This means that the impact of low world prices on consumption is limited.

The United States is the largest consuming country. However, the proportion of coffee consumers has declined since the 1960s. The demand for soft drinks and juices has increased relative to coffee use. Some analysts blame poor quality brews for the fall in demand. The United States imports large quantities of soluble (instant coffee) and gives less emphasis to quality than in most of northern Europe. A program to encourage the use of higher quality brews with a better flavor might boost consumption levels (Marshall, 1983). West Germany has a high per capita consumption of about 7 kg, and imports about 7 million bags annually. Its demand for good quality coffee is the reason that Kenya is major supplier.

Demand appears to be more price elastic in developing countries. Major consuming countries include the Arab countries. Increases in oil prices increased income levels

and helped boost the consumption of coffee in the region. These countries are not part of the International Coffee Agreement and serve as important non-quota markets for producers like Kenya. Lower prices in the non-quota markets also have aided consumption increases there.

Demand among producing countries of Africa and Asia is very low. For example, Kenya consumes three percent of total production -- per capita consumption is only 0.2 kg. Large producers from Latin America consume more coffee. For example, Brazil's consumption is about one third of domestic production.

World Trade

Coffee is exported largely in the form of green coffee. Of total world exports, four percent is soluble (instant) coffee, and about one percent is roasted and ground coffee. There are relatively few tariff barriers for imports of green and processed coffee, although there are substantial differences among importing countries. The European Economic Community (EEC) is the largest single import market for coffee and maintains an external tariff (on green coffee) of 5 percent. But it allows duty free imports from African, Caribbean and Pacific (ACP) countries and other developing countries.

Price quotations from the New York exchange are regarded as representative of the world prices. Coffee is

sold on the spot and futures market. Coffee is also traded in London, Bremen, and Paris. In the long run, world supply can be increased through better cultivation, more complete harvesting and reduced intercropping. After 1977, for example, producers responded by increasing supply and prices fell sharply from 1978-1980 as output and stocks rose. Low prices and high stocks persisted until the re-introduction of export quotas in October 1980. New plantings also enhance supply, but only in the long-run due to the production lag before new trees reach the harvesting stage. Market prices are inversely related to world stocks. High stocks and low real prices prevailed during the 1960s and early 1970s until frost reduced Brazil's crop. World stocks declined to about four months of normal consumption and average prices rose more than fivefold by 1977.

Price and Quality

Coffee quality is judged on the characteristics of raw coffee beans, roasted beans, and cup liquor. Important quality factors include the size of the beans; the more even-sized and larger beans are preferred. The best coffee roasts are described as "bright". If the cup quality is described as "hard", its flavor is characteristic of the standard Brazilian coffee. A "soft" cup is characteristic of arabica coffee (Mwandha, Nichols, and Sargent, 1985).

Grading and sorting are done after processing. The

method of processing affects quality. Imperfections, such as beans broken due to poor processing, downgrades bean quality. The "wet" method, in which the cherries are wet-pulped, is usually done for arabica coffee. The "dry" method is a cheaper process, since the cherries are simply dried out. Quality is also affected by climatic conditions, soils and elevation.

Different coffee types have different markets and prices. High quality arabica (Colombian milds) is preferred in some markets due to its mild taste (soft), full flavor and lower caffeine levels. Brazils (unwashed arabicas) have a mild but hard taste, and robustas have a bitter taste. Because of blending requirements, the three commercial types of coffee are partly complementary goods.

Coffee can be brewed from roasted beans or made from instant coffee. Two broad coffee markets can be recognized. The market for soluble (instant) coffee uses all three commercial types of coffee. Instant coffee is made from roasted ground beans. The soluble parts are extracted by the freeze-drying method, which preserves the taste better and yields more solubles, or the spray-drying method. Robusta coffee is widely used because it is available at lower prices and has larger amounts of solubles.

Milds, brazils and robustas may be used as substitutes depending on the price differential between them. Price differentials were reduced substantially during the 1970s as demand increased for robusta and instant coffee (it accounts for more than 30 percent of total world sales). Robusta prices were typically 20 and 40 percent below arabica prices until the introduction of instant coffee and later blending techniques.

The second market is for blends of roasted coffee. Blending of roasted coffee results in more even quality and produces a more standard product. Blending, roasting and grinding differs among markets as a result of consumer preferences. For example, French roast is popular in Latin America and the Middle East, while lighter roasts are preferred in northern Europe. Blends containing a higher proportion of robusta are popular in southern Europe. Those containing a high proportion of arabica tend to dominate northern European markets and arabicas command higher prices in these markets.

Blending limits price differentials among coffee varieties. It helps offset major changes in availability of specific bean varieties because of frost or other export restrictions. A high quality, mild-tasting blend requires

the combined use of brazils (unwashed arabicas) and other milds (washed arabicas). The demand for each type depends on price differentials. A shrinkage in the price differential leads to a reduction of brazils in the blend. A widening price differential raises the use of the brazils but only in so far as the taste of the blend will not be compromised. Quality milds therefore continue to have a market somewhat independent of the other varieties.

Competition from robusta is limited in the high quality markets due to its bitter taste. A more bitter blend (lower quality) may be made from brazils and robustas. If the price differential between brazils and robustas narrows, brazils substitute for robustas, raising the quality of the cheaper blends (Geer, 1971).

In general, the highest prices go to Colombian milds. The highest value of exports during the period 1972-82 was received by producers of arabica coffee. Values were 20 percent higher than the world average. The lowest average export value during the same period was obtained by the robusta producers.

In the recent past, demand for decaffeinated coffee has risen. Almost 10 percent of world coffee consumption is decaffeinated. Europe consumes half of the world supply, with the highest consumption rate in West Germany.

As demand increases, robusta exports may rise. Robusta has some advantages for decaffeination. It is cheaper and gives a higher caffeine yield during processing, which is later used in cola beverages or in medical remedies. So much flavor is lost in decaffeination that good quality arabica beans are not required (De Graaf, 1986).

During periods when ICA quotas were in effect, price differentials were affected by quotas. For example, between 1981 and 1986, arabica coffee prices averaged 20 cents a pound above robusta prices. When quotas were suspended during 1986-1987, the difference narrowed to 10 cents a pound. When quotas were reinstated in 1987/88, differences rose to 35 cents a pound (October-September). By the first quarter of 1990, the differential between robusta and arabica was 28 cents a pound. Despite lower prices for all coffee, the price for robusta seems to have suffered the most. Its price fell to 53 cents a pound in 1990, the lowest since 1975. This decline is partly explained by the market preference for arabica. Owing to high stocks of robusta coffee relative to demand, robusta prices are expected to continue their downward trend (International Monetary Fund, 1990).

The prices for arabica milds increased in 1990 and its premium of more than 50 percent is a record (Figures 4.1-4.3). Higher arabica prices were partly due to a reduction in Colombian and Brazilian crops as a result of adverse weather, causing a late harvest in the rest of Latin America. Despite the recent price recoveries for arabica, the introduction of new high yielding arabica varieties in Central America is expected to dampen any potential for price increases.

Developing countries can exploit further their potential by increasing processing and marketing of coffee concentrates. However, entry into these markets is hindered by the high degree of concentration of international firms. The industry has a strong emphasis on brand name and marketing expenditures are high. Both the freeze-and spray-drying methods used in coffee processing are highly capital-intensive. Lack of financial resources and market research, thus limit the involvement of producing countries in this market.

International Coffee Agreements

The first International Coffee Agreement was signed in 1962. The period between 1955 and 1962 had been characterized by falling prices and export earnings. A frost

attack on Brazil's crop in 1954 had reduced world stocks and raised prices. Higher prices encouraged new coffee plantings. Prices began to fall in the 1960s, as these plantings reached maturity. Competition intensified as new African producers emerged. Large stocks and continuing low prices prompted discussions on an International Agreement and eventually led to the signing of the ICA in 1962.

The ICA's main objective has been to control fluctuations in export levels and to ensure higher prices that are fair to both producing and consuming countries. The main regulatory instrument is the export quota system. The global quota for each year is based on expected consumption and changes in stock levels in importing members. The rate of increase in the individual export quota is proportional to the global quota.

However, production controls have been difficult to enforce. Prices are maintained within a predetermined price band, and production surpluses are held by the exporting countries. Prices in the quota markets are determined by the global quotas set by the ICA. Coffee prices in non-quota markets are competitive and therefore are much lower. This discrepancy has often forced the quota market to lower its prices in order to reduce the differential.

The market often has functioned without quotas in spite of the continuing existence of agreements. For example, between 1986-1987, a decline in supply triggered a price increase and the suspension of quotas. The latest ICA agreement broke down in 1989, and prices began to fall as competition intensified among the large producers. The ICA's composite indicator price (an average of US dollar prices for mild arabica and robusta coffees) averaged US $1.16 per pound during the first half of 1989 but quickly fell to 71 cents per pound in the third quarter and 62 cents per pound in the fourth quarter. Exports to all destinations rose by 19 percent in the second half of 1989 as exporters got rid of accumulated surpluses.

The price range adopted by the ICA often is adapted to prevailing market conditions and can be raised or suspended when demand is high, and lowered when demand is weak. Some economists view the ICAs as undesirable since they restrict competition in the coffee market. They argue that agreements at best have been able to stabilize prices only in the short-term, and then only for small changes in prices. In the event of long-term imbalances in demand and supply, the Agreement is more likely to break down (Akiyama, 1982).

Conflicts arise also from differences over the scale of production and the market shares for different coffee qualities. Different political and economic affiliations of producing and consuming countries heighten the conflicts.

The agreement has been suspended on several occasions. The quota system was last suspended in 1989 after the previous agreement expired and negotiations failed to effect a new one. Key issues that led to the suspension were disagreements on distribution of the quotas among the exporting countries. Most member countries argue that quotas favor countries that have had large market shares. Critics state that the quota system does not take into account changes in comparative advantage among producing countries.

Importing countries claim that quotas ignore changing tastes and have an inflexible distribution among arabicas, robusta and brazils. For example, the demand for higher quality coffee has promoted the consuming countries to insist on larger quotas of arabica from producers. Members also complain about the coffee sold at large discounts on the nonquota markets (mainly the Middle East and eastern Europe). The ICA has had a difficult time controlling these sales due to country interests that conflict with agreement policies. Increased sales in the

non-quota markets necessitate price reductions in the quota market from time to time. "Special contracts" between large producing countries and large roasters also affect coffee prices. The agreement thus has not been successful in maintaining higher prices for its members. Conflicts have gone unresolved for years and it is unlikely that an agreement will be reached soon that suits both the importing and exporting countries. The ICA has been extended till 1992 without the quota system.

Market Projections

The World Bank's projections assumed that quotas would operate through the year 2000. However, they also estimate prices in the event that quotas are suspended. It is estimated that demand would grow at a rate of 1.5 percent per year between 1989-2000. This approximates the growth rate of demand among ICA importers (ICA members account for 85 percent of the world imports). The coffee prices were estimated to stay within a range of US $1.95 to US $2.15 per kg. Simulation results of the Bank's model indicate that prices will be 10-20 percent lower during the 1990s if quotas are suspended. Stock levels are also expected to be high as production rises among large producers. Larger stocks may indicate that the existing low prices should be

fairy stable. The Bank's estimates have been confirmed by the decline in prices from 1989, when quotas were suspended.

Price differentials also have been growing since 1990. importers now are able to buy the best quality of arabica cheaply. These changes may have several implications for coffee producers. Coffee growers may improve quality --some countries, like Indonesia, have stopped growing robusta. It also implies that only those exporters that are able to improve productivity can remain competitive. Low prices reduce the profitability of coffee systems and draw farmers into the production of more profitable crops. Among some Latin American producers, poor coffee prices are expected to draw farmers into cocoa, sugarcane, food and oil crops and other off-farm activities.

Over time, world production can be easily increased to meet world demand at the estimated prices. In 1990/91, production rose to 92 million bags and global exportable production was about 72 million bags. World consumption was about 60 million bags. The high production levels are partly due to the competitive exchange rates adopted by coffee producers like Brazil, Colombia and Indonesia. These three countries have devalued their exchange rates by about 35

percent in the last five years. Currency depreciation has meant that even at the low prices, (world prices have declined by more that 30 percent over the same period), coffee prices have increased when measured in domestic currencies. Other exporters have had a difficult time maintaining their market shares and expanding export volumes as a result of overvalued exchange rates. For example, the French franc has appreciated substantially. This has increased the cost of coffee production and lowered profit margins in the CFA ("Le franceles colonies francaises d'afrique") zone where the domestic currency is linked to the franc, such as Ivory Coast.

Demands from oil exporting and other non-quota market economies are expected to grow less rapidly than they did in the 1970s and 1980s. Competition in these markets continues to be intense, especially since the breakdown of the ICA. Among other major consuming countries, soluble coffee consumption has been declining relatively more than that of roasted coffee. The price differential between arabica and robusta thus is expected to widen in the 1990's.

Market projections suggest that exporting countries will continue to face relatively stagnating world markets and low prices for their coffee exports. Their coffee

economies will depend on developments in the international coffee agreements, exchange rate policies, and changes in productivity in their agricultural sectors. Since coffee is an important source of foreign exchange, countries can offset low prices by raising productivity (hence their export volumes). This calls for structural changes and other domestic price policy adjustments that affect the profitability of producing coffee. Most studies indicate that the failure to maintain export shares in the world markets has been more important than poor prices as a cause of low foreign exchange earnings.

Coffee Production in Kenya

Agro-climatic conditions in Kenya are well-suited to coffee production. A well-distributed rainfall prolongs the flowering and harvesting periods, ensuring a steady output supply during the year. Ninety percent of the coffee produced in Kenya is arabica. Smallholder production is about 70,000 mt -- 60 percent of total production. Farmers with holdings between 0.5-4.9 hectares produce the bulk of Kenya's coffee. There is little potential for expansion in acreage, so yield increases are important to increase production. The Coffee Research Foundation has been working on the development of disease-resistant, high-yielding varieties.

Kenya is a member of the International Coffee Organization (ICO). In the past, quotas determined by the coffee agreement affected domestic stocks and exports. Production increased rapidly after 1973. No quotas were imposed on Kenyan exports between 1976 and 1979 (due to high prices), which encouraged additional plantings. High production levels prevailed in the early 1980s, leading to rapid stock accumulation. For example, Kenya's export quota in 1980 was 67,000 mt, but production was 91,000 mt. Kenya relies on non-quota markets to dispose of its excess output. Non-quota markets are competitive and coffee is sold at lower prices.

The processing and marketing of smallholder coffee is carried out through several organizations. The initial pulping process is carried out by the cooperative societies. The cooperatives also supply inputs and offer credit facilities. After pulping, coffee is delivered to the Kenya Planters Cooperative Union (KPCU) for further processing, grading and bagging. The Coffee Board, a government parastatal, is in charge of all coffee exports. Since stock management is important in the international coffee market, a large proportion of stocks is normally held by the parastatal.

Kenya has maintained its export quality. The "wet" processing method carried out on the estates and cooperative

factories ensures good grade beans. Kenyan coffee is graded into AA, AB, and C sizes for the auction. A small quantity of low quality unwashed coffee, also known as "Mbuni", is sold in domestic markets. In 1988, coffee accounted for 27 percent of the value of total exports. Average domestic consumption is only 3 percent of total production, and changes in domestic consumption therefore do not affect export volumes. Kenya's share of world coffee exports is about 3 percent. Kenya's major export markets include the European Economic Community (EEC) countries and other western European countries. Germany accounts for over 40 percent of exports. The Middle East and several non-producing African countries, especially those within the Preferential Trade Agreement (PTA) region, are important non-quota markets.

Coffee already is expanding to areas less suitable for production. Since 1979, increases in area planted has resulted in proportionally smaller changes in supply and average yields are declining. Smallholder yields averaged about 800 kg per hectare before the 1980s. Yields had declined to 580 kg per hectare by 1990 due to several factors. Poor husbandry practices, including low fertilizer use and limited spraying, have reduced yields considerably. Input use is especially important for arabica production and irregular supply or deficiencies affect coffee quality. Dry

seasons often require supplementary irrigation, but this is only available on the coffee estates. Coffee quality also has been inconsistent among smallholders, and the proportion of unwashed coffee berries (mbuni) has risen over time, further increasing the share of low quality grade coffee. Congestion at the cooperative factories is also a problem. In contrast, estate yields are higher and have remained constant, between 1,100-1,500 kg per hectare. As a result of irrigation facilities and higher fertilizer application, the quality of coffee beans also is higher for the estates.

The institutional structure of the coffee industry affects domestic cost margins. Producer prices for coffee growers have been declining relative to world prices. During the early 1970s, prices for smallholders were 70-75 percent of the export value, but by 1980-81 their share fell to 67 percent of total sales value. The estates received 87 percent of total sales value. Smallholder earnings are channelled from the Coffee Board to the Cooperative Bank, the Cooperative Unions, and finally to the cooperative societies. Smallholders receive their final payment through their factories or societies, often after long delays (De Graaf, 1986).

The Cooperative Unions have a poor system of accountability. Expenditures are neither appraised nor reconciled. Increasing parastatal overheads at a time of low

world coffee prices has further reduced producer prices and discouraged coffee production in most regions. Disenchantment with the marketing system has caused many farmers to switch to alternative crops and more profitable exports such as tea. An increasing proportion of coffee holdings are neglected (uprooting coffee trees is illegal). Farmers often interplant coffee with other crops, decreasing the quality of beans.

Since suspension of the ICA quota systems in 1989, coffee export prices have continually declined. Domestic prices fell by 19 percent in 1990. Coffee deliveries to Kenya Planters Cooperative Union (KPCU) fell further, from 116,000 mt in 1988 to 90,000 mt in 1990. In total, production from the cooperatives and estates declined by 11.2 percent and 10.9 percent, respectively, in 1990.

A re-organization of the marketing system is necessary to regain production levels. Producer incentives will be enhanced by raising their share of earnings. Several attempts have been made in recent years to streamline the coffee industry. In 1991, a presidential committee was appointed to investigate the KPCU (Weekly Review, 1991). Key reform issues include the following: the reversal of the present management structure; greater representation of all coffee growing areas; greater participation from the smallholders via their cooperatives; and increasing KPCU's

autonomy. The parastatal reform strategy, initiated in April 1991, also involves major donors, such as the World Bank and the International Monetary Fund.

Conclusion

The future of world coffee trade depends on developments in the international coffee agreements, exchange rate policies, and changes in productivity among exporting countries. Future market projections suggest that exporters will to face stagnating world demand and low prices. Exporters can offset low world prices by raising productivity and by depreciating domestic currencies. In Kenya, producer prices for coffee growers have been declining. This has contributed to low production and export levels as well as poor coffee quality. Changes in marketing structure are necessary in order to regain past export levels. Producer incentives could be enhanced by raising their share of export earnings.

FIGURE 4.1: COLOMBIAN MILDS AND BRAZILS

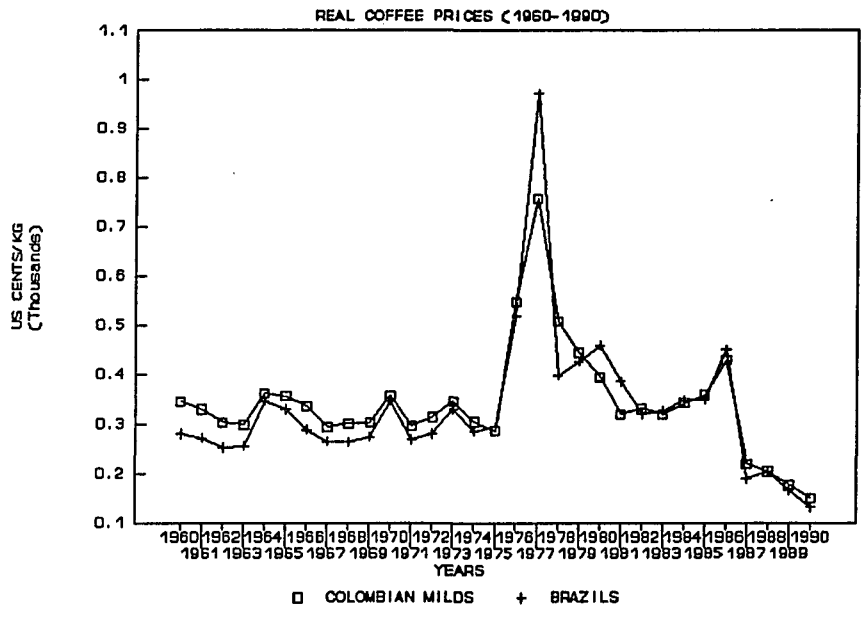


FIGURE 4.2: COLOMBIAN AND OTHER MILDS

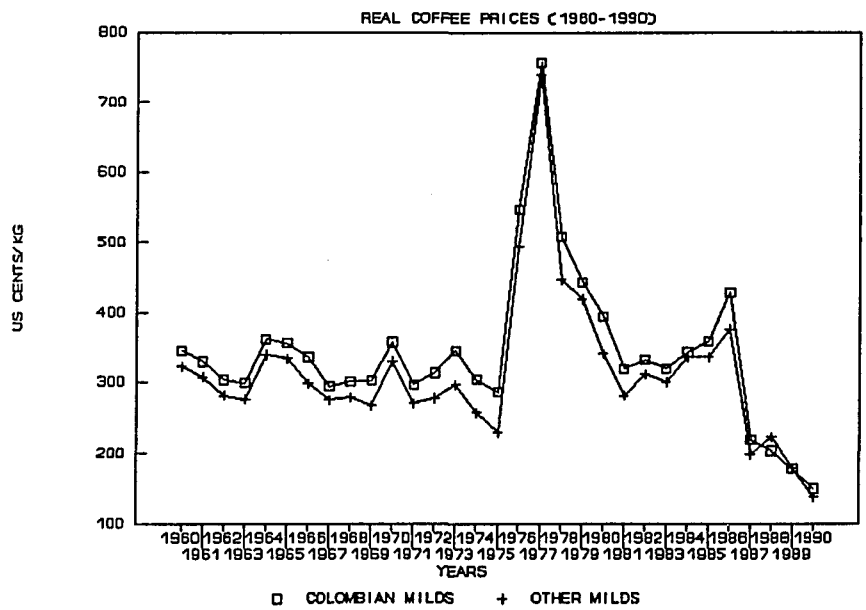
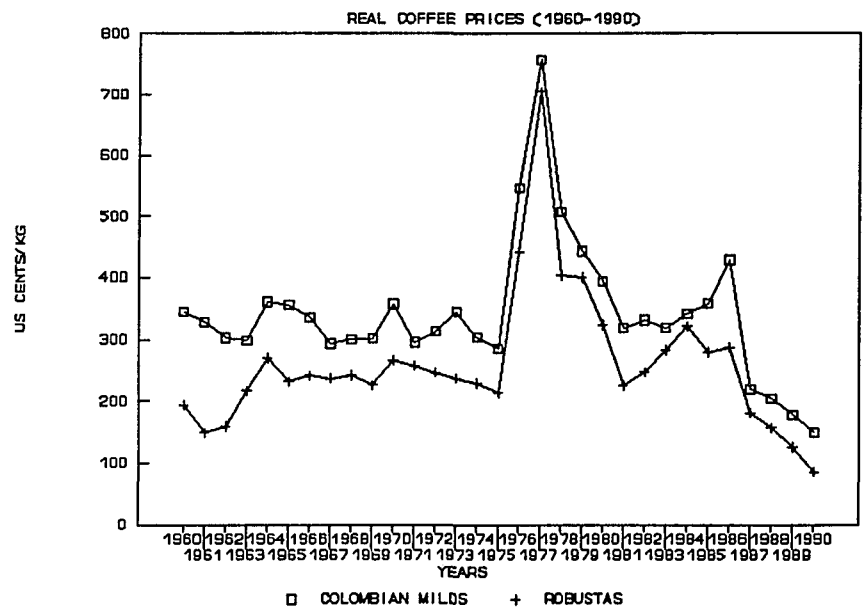


FIGURE 4.3: ROBUSTA AND COLOMBIAN MILDS



CHAPTER 5

THE WORLD MARKET FOR PYRETHRUM AND PYRETHRUM PRODUCTION IN KENYA

Pyrethrum is a perennial herbaceous plant whose white flower heads produce pyrethrin, an active ingredient used in insecticide manufacture. Pyrethrins are toxic to many insects but not to man or animals which makes them useful in food processing industries, warehouses and for household sprays. Kenya is the largest pyrethrum producer and exporter. Price and supply fluctuations in the world market have been partly influenced by Kenya's production pattern. Prices are also influenced by the availability of synthetic substitutes. This chapter examines the world market for pyrethrum and in particular, Kenya's role in the market. Pyrethrum production and marketing systems in Kenya are discussed in the last section of the chapter.

World Market

Since 1965/66, Kenya's market share of the world exports has been over 50 percent. In 1990, its market share was more than 70 percent. Other exporting countries include Tanzania, Ecuador, New Guinea, Yugoslavia, Japan (Table 5.1).

TABLE 5.1

WORLD PRODUCTION OF PYRETHRUM FLOWERS

('000 mt)

	KENYA	RWANDA	TANZANIA	ZAIRE	ECUADOR	TOTAL WORLD
1980	10,424	869	1,624	160	200	13,527
1981	15,704	955	2,002	150	200	19,341
1982	18,720	1,088	1,899	100	150	22,257
1983	8,974	1,194	1,601	100	150	12,352
1984	3,156	546	1,439	80	150	5,771
1985	3,101	786	1,532	80	150	6,099
1986	3,117	585	1,500	60	150	5,837
1987	6,407	600	1,450	NA	130	8,942
1988	6,080	550	1,400	NA	130	9,121
1989	7,538	625	1,500	NA	NA	10,163
1990	8,988	650	1,500	NA	NA	11,638

Sources: Winter-Nelson, A. "Marketing Boards and Market Power: The Case of Kenyan Pyrethrum," Ph.D. Dissertation, Stanford University, Stanford: California, 1992.
Republic of Kenya. *Economic Survey*. Central Bureau of Statistics, Government Printer, Nairobi: various years.

The United States is the largest importer and accounts for 50 to 80 percent of the world trade. Its large import share is partly as a result of government regulations that limit the use of synthetics in some industries.

Pyrethrum contains only a small proportion of pyrethrin, so trading is in the form of extracts. Ninety percent of the world pyrethrum exports are in the form of pyrethrin extracts. Crude extract exports have a high wax content, making them unsuitable for direct use. Countries that export the "pale" extract, which requires less processing before its final use, fetch higher prices. The rest of exports are in the form of dried flowers or powder. A by-product of pyrethrum, known as marc, contains small amounts of pyrethrin and is exported to Asian and African countries for the manufacture of mosquito coils.

The demand for pyrethrum arises from special properties which are not found in synthetic substitutes: a rapid "knock down" ability, which means they have an immediate paralyzing effect on insects; good killing power over a wide range of insect species; their repellency characteristic, which means that most insects avoid areas under treatment with

pyrethrum; pyrethrins are non-persistent and break down into harmless compounds on exposure to sunlight; and insects do not develop a resistance to pyrethrum insecticides even after frequent applications (Winter-Nelson, 1992; Zajadac, 1970). Pyrethrins decompose rapidly when exposed to light, air, and moisture. In agriculture, they usually are suitable only for use on crops close to harvest. This makes them less competitive in the market for agricultural pesticides.

The use of pyrethrum insecticides suffered a decline following the discovery of synthetic pesticides. Synthetics have lower costs, greater toxicity and more durability to weathering. The erratic production pattern of Kenya, leading to fluctuations in price and export levels, may also have contributed to the development of synthetic substitutes. (Perkins, 1987). Kenya's production declined from 7,400 tons in 1945 to 2,300 tons in 1953. It took almost 15 years for Kenya's pyrethrum industry to regain the production levels of the war years. By 1961, world production was over 10,000 tons, more than the world market could absorb. Demand grew slowly in the mid-1960s (Zajadac, 1970).

Towards the end of the 1960s, demand for synthetic pesticides declined slightly, especially in developed countries. This may have been due to increased pest

resistance to chemical insecticides. Resurgence and secondary pest outbreaks were common. Concerns about health and environmental hazards from synthetic insecticides, led to the promotion of natural and safer insecticides helping increase the demand for pyrethrum (Perkins, 1987).

Two developments during the mid-1970s further raised demand for pyrethrum exports. One was the development of aerosols, which increased the consumption of insecticides in the household where pyrethrum is especially suitable. The second was the discovery of synergists. Insecticide synergists are compounds which have no toxic effect but substantially enhance the toxicity of an insecticide. Pyrethrum-based insecticides are rapidly detoxified in insects and the synergists enhanced the toxic substances in pyrethrin by increasing and prolonging their effect. Synergists were produced at lower costs, reducing the overall costs of pyrethrum insecticides (Zajadac, 1970).

The pyrethrum market also has been affected by the discovery of the chemical nature of pyrethrin. Allethrin was the first of the synthetic pyrethroids to become widely used when pyrethrum was in short supply. Some pyrethroid qualities include high toxicity to insects, low mammalian

toxicity, environmental compatibility, good knock out effect, and low application rates.

Synthetic pyrethroids now compete with natural pyrethrin in many areas. Pyrethrin and synthetics can be substituted for each other, or a combination may be effective, as in household aerosols. In practice the level of synthetics added to aerosols is about 10 times the concentration of pyrethrin (there is normally a threefold difference in dosage required to cause death over that required to cause the "knock down" effect). This flexibility means that the amount of pyrethrum used depends on price and availability relative to that of synthetics substitutes.

The price of pyrethrum exports is often based on a 25 percent pyrethrin content. However, actual imports often have a higher content level. For example, imports to the United States often have 50 percent pyrethrin content. Prices are also determined by pyrethrum supplies, the price of synthetics, consumer preferences, and laws that govern the use of toxic synthetic substitutes.

The cost of synthetics determines the maximum price for pyrethrum exports. If the price of pyrethrum exceeds a "choke" price set by synthetics, consumers will substitute

pyrethrin for synthetic pesticides. The change to synthetic substitutes is often irreversible. This is due to the high costs involved in registering new synthetics and in re-adjusting pesticide production systems to the use of synthetics. Reverting back to pyrethrum may be uneconomical. Also, due to supply uncertainties, most importers are not willing to change back to pyrethrum. This trend has further contributed to a decline of pyrethrum's market share (Winter-Nelson, 1992).

Competition between pyrethroids and pyrethrum also is determined by regulations that govern the use of synthetics. In areas that require stringent safety precautions, pyrethrum has maintained its market share and fetches better prices. For example, the United States Environmental Protection Agency (EPA) has enforced strong regulations for use, application and handling of pesticides. Many synthetic toxic pesticides are either banned or approved for limited use. Food processing is the primary area of pyrethrum use in the United States, accounting for about 60 percent of total use.

Extraction plants are highly capital-intensive and small plants are uneconomical. The extraction of pyrethrin

near producing areas before exporting to world markets saves freight and storage costs and also reduces the deterioration of pyrethrin. Since importers do not carry pyrethrum stocks, this implies that Kenya has to effectively manage stock levels to ensure adequate supply during periods of production shortfalls. Currently, stock levels to fluctuate in response to unstable production levels (Winter-Nelson, 1992).

Demand for pyrethrum is still substantial because insect species have yet to develop significant resistance. Pyrethrum is also valued due to its low environment impact and its ability to meet safety standards. However, failure to maintain adequate export levels encourages the adoption of synthetics. Studies indicate that pyrethrum shortages have helped accelerate the increased use of synthetic pyrethroids. It has also led to the development of newer, safer, and hence more competing pyrethroids. Lower pyrethrum prices would therefore improve its competitiveness against synthetics and improve export levels.

Pyrethrum Production in Kenya

Pyrethrum was introduced to Kenya during the 1920s. By 1950 it had become the main export crop in some highland

regions. Like other export crops, the bulk of total production initially came from large farms. But since 1965 smallholder production has become more important. In 1990 smallholders produced 78 percent of Kenya's total production. Two regions, Kisii and Nakuru districts produce over 75 percent of total production.

A study on agricultural change in Kenya's Kisii district by Uchendu and Anthony concludes that the introduction of pyrethrum among smallholders in the Kisii highlands was very profitable and provided the capital necessary for investments in tea production. Additional income from tea and pyrethrum exports also made it possible for small holders to invest in alternative production activities, like dairy (Johnston, 1989).

Pyrethrum grows best in highland regions up to a height of 3,000 meters, with a rainfall of 1,200 mm. The content of pyrethrin increases with altitude and cooler temperatures. Pyrethrum is therefore an important source of income in highland areas, where alternative cash crops are less suitable. In places below 1,600 meters with rich soils and heavier rainfall, the plant will grow profusely but its insecticidal content is lower. In such areas,

pyrethrum competes with other food crops. For optimal pyrethrin yield, flowers are picked on hot dry days after fully blooming. Flowers are and stored in air-tight conditions. Adequate storage and transportation infrastructure near the producing areas are critical to pyrethrum quality (O'Connor, 1971).

Pyrethrum's share in the total value of exports is smaller than coffee or tea. The total value of pyrethrum exports was estimated at Kf 20,930 in 1990 compared to Kf 314,505 from tea exports (Republic of Kenya, 1990). However, it still remains an important source of foreign exchange and smallholder income. Pyrethrum is easily adopted by smallholders because harvests begin less than a year after planting. Plants continue to flower for four years. Increases in smallholder production also have been influenced by the abundance of family labor. Labor is an important input because pyrethrum is a labor-intensive crop, especially during the harvesting and weeding periods (O'Connor, 1971).

After plucking, flowers are taken to co-operative societies for initial drying. About 90 percent of the flowers are processed into pyrethrin extract. Competition

from new synthetics during the 1970s forced Kenya to introduce a scheme that classified the flowers according to pyrethrin content. Previously, Kenya's exports consisted of dried flowers. Today, most of its exports are now in the form of extract. Extracts command higher prices at the world markets due to higher pyrethrin content.

The Pyrethrum Board of Kenya (PBK) oversees production and exports of all pyrethrum. It is responsible for the manufacture of extracts, grading and marketing. PBK also has been doing research for better varieties with higher yields and pyrethrin content. New methods of propagation have increased production and pyrethrin yields.

Though Kenya's climatic conditions are well suited to pyrethrum production, production patterns and hence, world supply, have been erratic. Production fluctuations have been caused by several factors. In the past, PBK has controlled production and export levels by licensing growers in accordance with predetermined annual quotas. Such quotas were based on the Board's estimate of world demand. The Board tried to influence market prices by controlling supply and stock levels. However, because it has not been able to accurately predict changes in demand, production and

export levels often have been poorly matched to market requirements.

During most of the late 1970s and early 1980s, supply was greater than world demand because many importers had adopted synthetic substitutes. Stocks accumulated rapidly between 1976 and 1984, and prices declined. Low producer prices caused farmers to reduce production and switch to other crops, such as tea. Land settlement schemes in the 1970s also reduced total acreage under pyrethrum. Despite an increase in demand since 1984, production of pyrethrin extract has risen only slowly. Low production and stocks levels have persisted for much of the late 1980s and into the 1990s.

Production levels continue to fluctuate in response to changes in demand and a lack of production incentives. Farmers incentives are influenced greatly by the pyrethrum price. The Board announces an interim price based on its estimates of world market conditions. This price is based on pyrethrin content. If world prices are higher than expected, a final payment is made to farmers. When the export value falls below expected prices, it may result in cash flow problems and delayed payments. Interim producer prices that

are not consistent with world market prices thus often lead to payment delays and eventually to poor deliveries to the Board. The government reorganized methods of payment to farmers in 1987 in an effort to increase production. Production levels increased by 9.7 percent in 1988.

Production is also affected by the relative profitability of alternative crops. For example, in Kisii district, production share had dropped by about 20 percent in 1990 because farmers have shifted to other crops like tea and bananas. Further production reductions are expected in Kisii, since the farmers continue to receive payments via cooperative societies and experience more delays and larger deductions than farmers in other areas (Winter-Nelson, 1992).

Conclusion

The market for pyrethrum exports has declined, following the discovery of synthetic pesticides. Price and supply fluctuations in world markets have contributed to the current market trends. Such trends are likely to continue unless exporting countries raise production levels. Kenya is the largest producer and exporter of pyrethrum. Its stocks and production levels are important factors in determining the future of the pyrethrum trade. Under a well managed

production and export policy, Kenya has the potential to meet the world demand for pyrethrum. Increases in productivity would not only raise export levels, but also would reduce world prices so that pyrethrum would remain competitive against synthetic substitutes.

CHAPTER 6

KENYA'S TERMS OF TRADE

Critics of an export-led strategy argue that poor export performance among developing countries is largely a result of external factors, particularly the long-run deterioration in the terms of trade. The ratio of export to import prices is claimed to decline over time, adversely affecting exporting countries' national incomes and their development efforts. The literature reviewed in Chapter 2 shows that the terms at which developing countries exchange their agricultural exports for imported manufactured goods varies by country and commodity. Prices for commodity exports move in different directions since each is subject to different conditions of supply and demand.

Most empirical studies have focused on the net barter terms of trade (NBTT). But changes in the NBTT do not account for productivity increases or changes in export volumes. Inferences about gains from international trade are best determined by measuring changes in the factoral terms of trade. Such measures indicate changes in the purchasing power of exports and the real costs of domestic factors used in export production.

This chapter estimates changes in the terms of trade for three of Kenya's primary exports: coffee, tea, and

pyrethrum. In view of the scarcity of empirical work on the factoral terms of trade and to facilitate estimation of Kenya's overall gain (or loss) from trade, Kenya's single factoral terms of trade (SFTT), double factoral terms of trade (DFTT) and the income terms of trade (ITT) are calculated.

Price Indices

Export, import, quantity and productivity indices are needed for the various terms of trade measures. An index number expresses the relationship between the value of a variable in the base year and the value of that variable at some other point in time. The base value is calibrated at 100 and all values in the time series are expressed as percentages of the base year value. For this study, two commonly used indices, the Laspeyres and the Paasche, are computed. The indices are averages of price ratios and differ only in the weights applied.

The Laspeyres price index is given by:

$$LIp = \frac{\sum P_N Q_O}{\sum P_O Q_O}$$

where P_o and Q_o represent the export (or import) price and quantity in the base year, and P_n and Q_n are the price and quantity in the given year. The Laspeyres price index uses quantities exported (or imported) in the base year and shows

how prices of goods traded in the base year have changed over time. Since the quantity weights remain unchanged, the effect of changes in the composition of trade over time is not measured in the index. Such changes may occur as a result of changes in consumption patterns. For example, exports may decline over time as a result of increases in domestic consumption.

The Paasche formula uses quantity traded in each period as weights. This index measures how the value of quantity currently traded has changed since the base year. The Paasche index is given by:

$$PIp = \frac{\sum P_N Q_N}{\sum P_O Q_N}$$

Year to year comparison of price changes is difficult because the quantities change in each period. For example, the change in a Paasche price index may reflect only a change in the commodity mix, while prices of individual commodities have remained the same.

Estimation of the Laspeyres and Paasche indexes is important to show the relationship between price and quantity changes in a country's trade patterns.
But whether the Laspeyres or the Paasche indices show greater changes depends on the source of a price change. If the price increase is due to an increase in demand, then

exports will increase for those commodities that rise in price. The Paasche index will show a greater increase than the Laspeyres index. When the price increase is due to changes in supply, then exports of those commodities that rise most in price will decline, and the change in the Laspeyres index will be greater than the Paasche index (Kindleberger, 1979).

Fisher's ideal index is calculated by taking the geometric mean of the Laspeyres and the Paasche index. This index compensates for the biases in the Laspeyres and the Paasche index. Fisher's price index is given by:

$$FI=\sqrt{\frac{\sum P_N Q_O}{\sum P_O Q_O} * \frac{\sum P_N Q_N}{\sum P_O Q_N}}$$

Export price and volume data are presented in Table 6.1. There are substantial price differentials between different grades and varieties of exports. Hence, where possible, export prices used to compute the indices reflect specific qualiities.

Table 6.1

Export Volume and Price Series, 1964-1990

	Tea		Coffee		Pyrethrum	
Year	(US$/mt)	(mt)	(US$/mt)	(mt)	(US$/mt)	(mt)
1964	948.00	39,000	1076.00	43,000	57048.00	1,200
1965	1035.00	37,000	1069.00	39,000	55545.00	1,200
1966	979.00	52,000	1045.00	55,000	20895.00	1,700
1967	1065.00	43,000	924.00	51,000	20744.00	1,900
1968	879.00	63,000	939.00	38,000	19148.00	2,200
1969	794.00	75,000	992.00	51,000	16959.00	2,400
1970	930.00	36,000	1243.00	54,000	18508.00	1,800
1971	940.00	34,000	1087.00	57,000	20970.00	2,700
1972	830.00	47,000	1250.00	63,000	20798.00	3,400
1973	870.00	51,000	1599.00	75,000	23440.00	3,400
1974	1180.00	50,000	1715.00	72,000	26908.00	4,600
1975	1150.00	53,000	1793.00	68,000	30206.90	5,000
1976	1340.00	59,000	3477.00	78,000	26996.20	4,200
1977	2390.00	70,000	6791.00	96,000	28780.40	3,700
1978	1730.00	85,000	3643.00	91,000	40332.80	1,700
1979	1660.00	94,000	4043.00	81,000	27715.80	955
1980	1850.00	75,000	3942.00	80,000	85239.80	757
1981	1636.00	76,000	3204.00	86,000	89612.60	598
1982	1660.00	88,000	3205.00	101,000	76971.50	640
1983	1915.00	101,000	3122.00	91,000	60681.80	1,147
1984	2835.00	91,000	3248.00	97,000	54072.30	843
1985	1611.00	126,000	3439.00	105,000	55293.30	742
1986	1686.00	110,000	4850.00	127,000	55185.60	850
1987	1326.00	135,000	2721.00	100,000	60626.10	459
1988	1366.00	138,000	2717.00	88,000	39072.69	488
1989	1516.00	163,000	2362.00	104,000	71498.00	540
1990	1493.00	181,000	2138.00	93,000	80419.00	453

Source: Food and Agricultural Organization. *Quarterly Bulletin of Statistics*. Rome: FAO, various years.
Republic of Kenya. *Economic Survey*. Central Bureau of Statistics, Government Printer, Nairobi: various years.
United Nations Conference on Trade and Development. *Commodity Yearbook*. Geneva: UNCTAD, 1984.

Tea prices refer to the Mombasa auction price for Kenya's black tea exports. The price is an annual average price of Kenya's high grown and medium grown tea. Kenya's arabica coffee is classified as a high quality Colombian mild. The export price -- an annual average value-- refers to the world price for Colombian milds at the New York market. Pyrethrum prices are determined by the content of pyrethrin. The quoted prices are for extract with pyrethrin content of 50 percent. To facilitate comparison, all prices are given in US dollars per metric ton.

The export price indices for the three primary exports are presented in Table 6.2. Overall, the aggregate export index (Fisher's index) shows a gradual but positive increase in most years between 1964 and 1986 (Figure 6.1). Price movements in commodity markets during the mid-1970s were favorable for most primary exports. A distinct decline from 1987 onwards reflects the decline of export values relative to previous periods. For example, sharp increases in tea prices in 1984 were followed by price declines starting from 1985. By 1987, tea prices were 50 percent lower than the 1984 prices.

TABLE 6.2

EXPORT PRICE INDICES, 1964-1990.

YEAR	PAASCHE	LASPEYRES	FISHER
1964	44	39	41
1965	45	40	42
1966	31	33	32
1967	30	33	31
1968	29	30	30
1969	28	29	28
1970	31	35	33
1971	29	33	31
1972	30	34	32
1973	36	41	38
1974	40	47	43
1975	42	49	45
1976	60	77	68
1977	112	144	127
1978	83	87	85
1979	89	90	89
1980	100	100	100
1981	85	86	86
1982	84	85	85
1983	85	85	85
1984	99	99	99
1985	85	84	85
1986	109	107	108
1987	70	70	70
1988	69	67	68
1989	70	69	69
1990	68	66	67

Source: Author's Calculations

The Laspeyres and Paasche indices show only small differences indicating that demand and supply for Kenyan exports has been relatively stable (Figure 6.2). An exception in the observed trend is the period between 1970 and 1978, when the Laspeyres index was higher. The greatest difference occurs in 1977 when the Laspeyres index was 142 and the Paasche index was 112. A higher Laspeyres index value suggests that changes in supply were of predominant importance. The increasing ratio of Laspeyres to the Paasche index is not surprising since this period was characterized by a rapid growth in export volumes.

To estimate quantity trends, the Laspeyres and the Paasche volume indices are computed and used in conjunction with the export price index to arrive at the income terms of trade measure. The Paasche volume index is given by:

$$LIq=\sum \frac{P_O Q_N}{P_O Q_O}$$

The Laspeyres volume index is given by

$$PIq=\sum \frac{P_N Q_N}{P_N Q_O}$$

Table 6.3

EXPORT QUANTITY INDICES

(1964-1990)

Year	Paasche	Laspeyres	Fisher's
1964	75.7	66.3	70.9
1965	71.5	62.6	66.9
1966	83.3	88.3	85.7
1967	78.1	85.3	81.6
1968	85.6	87.5	86.5
1969	99.4	104.9	102.1
1970	73.1	83.5	78.1
1971	86.8	99.8	93.1
1972	105.9	120.5	112.9
1973	115.7	131.1	123.1
1974	124.5	148.2	135.8
1975	132.2	152.7	142.1
1976	116.2	149.4	131.2
1977	124.3	158.7	140.5
1978	121.1	127.4	124.2
1979	108.8	110.8	109.8
1980	100.0	100.0	100.0
1981	101.5	102.3	101.2
1982	118.2	118.7	118.4
1983	124.5	124.0	124.3
1984	120.5	120.0	120.3
1985	138.2	136.9	137.6
1986	152.5	149.7	151.1
1987	131.9	131.7	131.8
1988	127.8	124.1	125.9
1989	148.9	146.1	147.5
1990	146.9	142.7	144.8

Source: Author's Calculations.

Overall, Kenya's export volume indices show positive increase over the period of study. This reflects the rapid growth of Kenya's exports, accelerated by the entry of smallholders in export production. Kenya's exports capacity show the greatest decline in 1970, when the quantity index fell to 78 as a result of a decline in tea exports by nearly 50 percent.

The volume index for 1977 may have been overstated because of coffee exports smuggled from neighboring contries during the coffee boom. The index value of 151 in 1986 is attributed to a large increase in coffee exports. Declines of coffee exports (12 percent) and low pyrethrum exports contributed to the decline of the volume index to 125 in 1988. The growth of tea exports offset these declines during much of the 1980s and early 1990s caused an overall positive trend in the quantity index.

Productivity indices for agricultural exports were based on output and acreage data (Table 6.4). Output per acre indices for each crop are weighted to obtain the total productivity index. The yield index is calculated for the period between 1974-1987. The productivity indices and the export price indices are used to calculate the factoral terms of trade (Appleyard, 1974).

Table 6.4

Hectareage and Yield Series, 1974-1987

	Coffee		Tea		Pyrethrum	
Year	Area (Ha)	Yield (Kg/Ha)	Area (Ha)	Yield (Kg/Ha)	Area (Ha)	Yield (Kg/Ha)
1974	86,000	769	40,000	1328	19,000	722
1975	86,000	868	44,000	1309	19,000	790
1976	84,000	1205	50,000	1245	15,000	936
1977	90,000	945	55,000	1575	11,000	1016
1978	92,000	808	59,000	1591	10,000	828
1979	102,000	901	61,000	1613	14,000	572
1980	130,000	724	66,000	1364	21,000	498
1981	132,000	635	68,000	1327	25,000	629
1982	135,000	676	72,000	1331	12,000	1565
1983	135,000	881	74,000	1512	4,000	213
1984	138,000	673	77,000	1449	4,000	763
1985	144,000	838	79,000	1813	6,000	563
1986	151,000	724	81,000	1769	9,000	367
1987	154,000	829	82,000	1877	9,000	712

Sources: Republic of Kenya. *Economic Survey*. Central Bureau of Statistics, Government Printer, Nairobi: various years.
United States Department of Agriculture, Foreign Agricultural Circular. *World Crop Production: Coffee*. Washington, D.C: various years.
International Tea Committee. *Annual Bulletin of Statistics*, London: ITC, various issues.

The productivity index is given by:

$$YI_t = W_{i_t} Y_{i_t} + W_{2_t} Y_{2_t} + W_{3_t} Y_{3_t}$$

where

$$W_{i_t} = \frac{A_{i_t}}{A_{i_t} + A_{2_t} + A_{3_t}}$$

$$A_{i_t} = Acreage$$

t= 1, 2, 3....T years, and

i= 1, 2, 3....N export crops.

The terms W_{it} and Y_{it} denote the weight and the yield index for each export crop. Results are given in Table 6.5. Except for a few years, the productivity indices show a positive growth trend. The 1970s were the most favorable years. Such trends show that factor productivity in the agricultural sector improved. The decline of the index values in 1981 and 1984 was partly due to adverse weather.

A problem in compiling index numbers for imports is to how to treat changes in quality. The problem of quality has two facets. First, quality improves if the import product mix alters in favor of higher quality goods within a group.

Table 6.5

Productivity Indices, 1974-1987

Year	Export Yield Index	Labor Productivity Index
1974	108.9	77
1975	117.8	74
1976	143.3	81
1977	130.3	83
1978	116.9	95
1979	121.5	100
1980	100.0	100
1981	94.9	103
1982	106.8	106
1983	116.4	111
1984	98.7	117
1985	121.6	121
1986	108.9	125
1987	123.3	128

Sources: United Nations. *Statistical Yearbook*. New York: UN, various years.
Author's Calculations.

Second, technical progress imparts superior properties to a given good over time. Unit value indices therefore have an upward bias unless they are corrected for an increase in quality.

Productivity for manufactured imports is measured by the labor productivity index. The index represents exports from the industrial market economies to developing countries. It is calculated by dividing the index of industrial production by the industrial employment index. Industrial production includes manufactured exports such as chemicals, textiles, paper, and basic metals. Quality changes in manufactured goods are included in the value of industrial output. This means that the labor productivity index has a quality bias that would tend to overstate the deterioration of primary commodity export prices.

The import index used to deflate the export price index is the World Bank's manufacturing unit value index (MUV). It represents the unit value (in US dollars) of manufactured exports to developing countries from industrial market economies. The unit value index includes chemicals, manufactured goods classified by material, machinery, and manufactured articles.

To test for the bias caused by quality changes in Kenya's imports, a price index is estimated for manufactured commodities whose qualities probably have not altered much over time. The degree of quality changes in the import index depends on commodity classification. Hence, the sample excludes manufactured imports such as machinery and transport equipment, whose values have a significant qualitative bias (Table 6.6). The unit values for various categories of chemicals and basic manufactures were weighted together to obtain the import price indices. The computed indices are presented in Table 6.7.

A comparison of the computed import price indices and the manufacturing unit value indices reveals the effects of quality changes in manufactured imports. For example, between 1975-1976, the MUV fell by two percent while the import index shows a 6.5 percent decline. In 1978 and 1979, the estimated import index displays no changes while the MUV increased by 13 percent. The MUV indices show a significant increasing trend. However, with the exception of a few years, the computed indices generally indicates smaller price increases than the MUV (Figure 6.3).

Table 6.6
Kenya's Manufactured Imports: Price and Quantity
(1975-1986)

Year	Pesticides		Iron and Steel Shapes		Iron and Steel Wirerods		Coated Paper		Synthetic Fibres		Electric Distribution Equipment		Insulated Wirecable	
	US$/mt	MT	US$/mt	MT	US$/mt	MT	US$/mt	MT	US$/mt	MT	US$/mt	MT	US$/mt	MT
1975	2941.58	2,876	367.19	11,176	300.13	3,935	1357.53	3,787	3093.89	2,045	2361.98	2,257	2490.97	1,884
1976	2786.67	4,233	318.74	17,080	301.3	7,431	1286.64	3,670	3015	3,265	2596.46	736	2460.16	615
1977	2616.15	9,027	312.54	26,755	275.91	14,432	1407.65	4,440	2785.58	6,301	2810.97	1,100	2940.74	810
1978	2989.27	8,582	340.55	27,015	283.25	15,015	1494.68	6,024	2318.68	6,671	2617.97	1,369	2666.96	1,111
1979	1559.53	15,733	456.68	20,881	427.67	12,406	1727.6	6,909	3223.96	4,590	3875.53	1,631	4591.42	1,143
1980	4545.56	6,430	465.25	33,973	418.26	17,927	1949.68	5,191	3450.31	4,186	2551.19	1,631	2999.12	1,143
1981	4127.2	4,882	340.55	28,610	297.07	21,934	1807.05	4,364	3212.41	1,563	3435.95	1,975	3473.21	1,699
1982	3257.55	4,900	378.63	26,535	342.96	21,784	1030.75	3,838	2242.7	1,096	1820.79	5,541	3103.34	2,748
1983	4587.88	5,860	329.58	20,717	297.1	18,980	1317.24	8,987	2352.94	782	2837.69	3,746	2779.08	3,644
1984	4587.55	5,860	329.58	20,717	297.1	18,980	749.23	10,436	1138.57	700	3778.71	827	2779.08	3,644
1985	4608.53	4,897	375.95	26,126	323.1	14,668	749.23	10,436	1138.57	700	3778.71	827	4701.37	509
1986	4883.22	6,260	405.52	23,133	321.23	15,198	815.98	10,945	5537.4	1,096	4868.33	1,162	5657.6	809

Source: International Trade Statistics Yearbook, Volume 1, various issues.
Department of International Economics and Social Affairs, Statistical Office,
United Nations

Table 6.7

Import Unit Value Indices (1975-1986)

Year	Paasche	Laspeyres	Fisher's	MUV
1975	77	75	76	63
1976	71	71	71	64
1977	68	70	69	70
1978	70	72	71	80
1979	63	79	71	91
1980	100	100	100	100
1981	90	90	90	100
1982	75	72	74	99
1983	87	83	85	97
1984	77	76	76	95
1985	77	81	77	95
1986	92	110	100	112

[a] Manufacturing Unit Value Index

Sources: World Bank. *Commodity Trade and Price Trends*. Baltimore: The John Hopkins University Press, various years.
Author's Calculations.

The positive trend is confirmed time regression analysis. The regression equation for the MUV indices is given by:

$$MUV = 63.787 + 3.853t$$
$$(0.6640)$$

where t represents time. The standard error is given in parentheses. The regression equation for the computed import price index is given by:

$$\text{Import Price Index} = 70 + 1.524t$$
$$(0.8502)$$

The use of unit value as a proxy for price is a contentious topic among analysts. Unlike the use of actual prices, the underlying prices in a unit value index are an average of prices for different items. If there are large differences in prices of particular items, and the quantity weights vary from period to period, the unit index value will show excessive variations. This problem is referred to as the unit value bias, and applies particulary to imports because the range of imported goods for any particular import commodity grouping is far greater than for exports.

Analytical Results

A base year with very high or low prices creates a bias in the terms of trade measures. The chosen base year is

1980, assumed to represent a normal trading year. The terms of trade have been calculated for the period between 1964-1990. This period is long enough to establish a definite trend in the terms of trade, and represents relatively dependable sets of data for Kenya's imports and exports. The period is significant because it is characterized by rapid growth in export volume.

The results for Kenya's net barter terms of trade (NBTT) are presented in Table 6.8. The index showed the greatest increases in the mid-1960s, indicating the role of higher export values. For example, the index value was 140 in 1965. This was followed by a series of fluctuations during much of the 1970s and 1980s. Between 1968 and 1975 the NBTT displayed a steady decline. Between 1976-1978 the index was particularly favorable due to higher export prices. High coffee and tea prices contributed to a sharp increase in the NBTT index (181) in 1977 (Figure 6.4). Though the volume of Kenya's tea exports was lower in 1984 than in 1983, a withdrawal of Indian tea exports lead to a temporary price boom. The export value for tea rose by 33 per cent in 1984, contributing to the increase of the NBTT index to 104 (compared to 87 in the previous year). However, an increase in India's tea exports in 1985 and a

TABLE 6.8

NET BARTER TERMS OF TRADE

(1964-1990)

YEAR	Import Index[a]	Export index	NBTT
1964	30	41	137
1965	30	42	140
1966	31	32	103
1967	31	31	100
1968	31	30	96
1969	33	28	86
1970	35	33	94
1971	37	31	83
1972	40	32	80
1973	46	38	83
1974	57	43	76
1975	63	45	71
1976	64	68	106
1977	70	127	181
1978	80	85	106
1979	91	89	98
1980	100	100	100
1981	100	86	86
1982	99	85	85
1983	97	85	87
1984	95	99	104
1985	95	85	89
1986	112	108	96
1987	123	70	56
1988	132	68	51
1989	131	69	53
1990	139	67	48

[a]Manufacturing Unit Value Index.

Source: World Bank. *Commodity Trade and Price Trends*. Baltimore: The John Hopkins University Press, various years.
Author's Calculations.

record production level in Kenya drove world prices down by about 40 percent. Such price declines had some negative impact on the terms of trade and the NBTT declined by 11 percent compared to the 1980 base value.

As a result of higher production levels and the suspension of the ICO quotas, coffee exports rose by 20 percent in 1986. A poor coffee crop in Latin America reduced the region's export share and lead to a temporary price increase of about 40 percent. As a result of the world market changes, Kenya's NBTT index recovered by nearly eight percent (96). Higher pyrethrum prices in the late 1980s did not have much effect on the index since export quantities remained very low. The sharp decline in export prices, especially 1987, is evident in the declining index values. By 1990, the NBTT index had declined by 50 percent from its base value.

Such changes would suggest less favorable terms of trade for Kenya's exports, meaning that higher levels of export, are required to maintain import levels. A time series regression shows the NBTT index declined over time. The regression equation for the NBTT is given by:

$$NBTT = 117.971 - 1.818t$$
$$(0.6149)$$

Income terms of trade (ITT) indices are presented in Table 6.9. Between 1964-1970, with the exception of 1969,

TABLE 6.9

INCOME TERMS OF TRADE, 1964-1990

YEAR	QUANTITY INDEX	NBTT	ITT
1964	70.9	137.6	97.5
1965	66.9	140.9	94.2
1966	85.7	104.4	89.5
1967	81.6	100.8	82.3
1968	86.6	95.7	82.8
1969	102.1	86.3	88.1
1970	78.1	94.4	73.8
1971	93.1	84.3	78.4
1972	112.9	80.4	90.9
1973	123.1	83.0	102.3
1974	135.7	76.3	103.6
1975	142.1	71.9	103.6
1976	131.7	106.0	139.7
1977	140.5	181.5	254.9
1978	124.2	106.1	131.9
1979	109.8	98.4	108.1
1980	100.0	100.0	100.0
1981	101.8	85.8	87.4
1982	118.4	85.3	101.1
1983	124.3	87.5	108.8
1984	120.3	104.4	125.5
1985	137.6	89.3	122.8
1986	151.1	96.6	146.0
1987	131.8	56.9	75.1
1988	125.9	51.8	65.2
1989	147.5	53.0	78.2
1990	144.8	48.4	70.1

Source: Author's Calculations.

Kenya's NBTT increased more than the income terms of trade. This indicates that increases in export values rather than increases in export volume resulted in a positive trend in the terms of trade. However, the trend for the ITT changed from 1973 onwards exhibiting greater increases than the NBTT (Figure 6.5). For example, in 1972 the ITT index value was 91 while the NBTT value was 80. An increase in ITT shows that the purchasing power of Kenya's exports increased.

The increase in ITT values are partly a result of the growth in export volumes. During the study period, the quantity index indicates a positive rate of growth, reaching a peak of 151 in 1986. There is a sharp decline in the ITT index from 1987 onwards. This is partly as a result of low world prices for coffee and tea, compounded by the decline in export quantities of coffee and pyrethrum. Still, the ITT indices show less sharp declines than the NBTT (between 1980-1990) meaning that low world prices for Kenya's primary exports were partly offset by increases in export capacity.

A time series regression shows the ITT had a positive trend unlike the NBTT. The regression equation is given by:

$$ITT = 99.435 + 0.286t$$
$$(0.902)$$

Kenya's terms of trade can be analyzed further by using the single factoral terms of trade (SFTT) and the double factoral terms of trade (DFTT). The results are presented in Table 6.10. The SFTT may also improve while the NBTT is deteriorating. The results suggest this to be the case for Kenya, since SFTT values were greater than the NBTT values between 1974-1987 (Figure 6.6). Kenya therefore was better off in that more imports could be purchased per unit of factor inputs employed in the production of its exports. The SFTT index rose rapidly from 1976 and maintained its positive growth rate through 1979.

Compared with the 1980 values, the index declined sharply in 1981 and 1982. The decline may be a result of productivity declines for pyrethrum and coffee. An increase in pyrethrum prices did not offset the decline in the index since export quantities and productivity remained very low. The index picked up between 1983 and 1986, largely a result of increases in tea productivity.

The DFTT index shows a period of positive growth between 1975 and 1979 (Figure 6.7). This trend indicates that factor productivity in Kenya's export sector was still favorable when compared to factor productivity in the

TABLE 6.10

SINGLE AND DOUBLE FACTORAL TERMS OF TRADE INDICES

(1974-1987)

YEAR	NBTT	SFTT	DFTT
1974	76	82	107
1975	72	84	114
1976	106	152	188
1977	181	237	285
1978	106	124	131
1979	98	119	119
1980	100	100	100
1981	86	82	79
1982	85	91	87
1983	87	102	92
1984	104	103	88
1985	89	109	90
1986	97	105	84
1987	56	70	55

Source: Author's Calculations.

manufacturing sector of its trade partners. During most of the study period the DFTT index is also greater than the NBTT (1974-1980). Even during periods of low prices, factor productivity growth for exports remained positive. However, from 1981 to 1987 the index shows a marked decline. The sharp decline in both the SFTT and DFTT indices was partly influenced by the fall in coffee prices by nearly 50 percent. The deterioration of the index is also influenced by quality changes incorporated in the labor productivity indices for manufactured imports. The SFTT thus is more useful than the DFTT index.

To test for the effects of quality changes in manufactured imports on the terms of trade indices, the alternative import price index is used to deflate the export price indices. The new terms of trade indices are represented in Table 6.11. The index values of the adjusted NBTT exceed the previous results from 1977 onwards. For example, in 1978 the adjusted series show a value of 120 while the index value in the previous series was 106. In 1984, the adjusted index increased to 130 in contrast to the unadjusted value of 104 in the same year.

Table 6.11

Adjusted Terms of Trade Indices

(1975-1986)

Year	NBTT	ITT	SFTT	DFTT
1975	60	85	71	95
1976	96	126	137	170
1977	184	259	240	289
1979	120	148	140	147
1979	125	138	155	155
1980	100	100	100	100
1981	96	98	92	89
1982	115	138	124	117
1983	100	124	116	105
1984	130	156	129	110
1985	109	150	133	110
1986	108	163	117	94

Source: Author's Calculations.

The results also show that there is no evidence of a secular deterioration in the terms of trade. A time regression confirms the observed trend. The regression equation of the adjusted NBTT series is given by:

$$\text{Adjusted NBTT} = 108.515 + 0.472t$$
$$(2.563)$$

The increasing trend is even more significant for the adjusted ITT index. In 1981, the ITT index rose to 138 compared to 101 in the previous unadjusted series. The regression equation for the revised ITT series is given by:

$$\text{Adjusted ITT} = 135.166 + 0.807t$$
$$(3.910)$$

The new series for the SFTT also showed greater increases than the previous results. The magnitude of change in the adjusted SFTT is substantial, especially from 1982. The net changes in the various terms of trade measures shows the influence of the quality bias in the import index. By adjusting the import index series, Kenya's terms of trade are shown to be more favorable than the previous results. Graphical illustrations of the adjusted terms of trade indices and the (actual and fitted value indices) are presented in Figures 6.8 - 6.15.

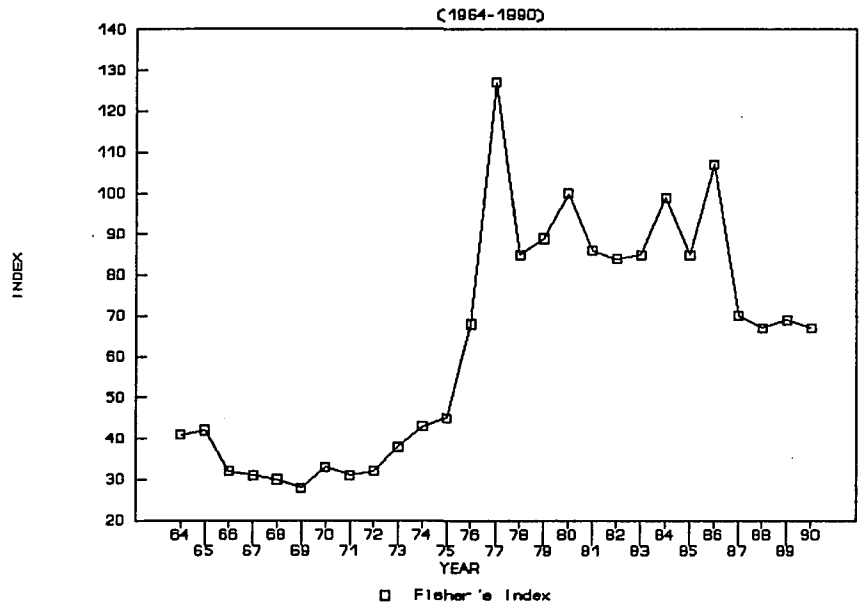
Conclusion

Despite some periods of declining terms of trade especially during the late 1980s, there is no evidence of a secular deterioration in the terms of trade between Kenya's primary exports and manufactured imports. Instead, during the period of study, the trend show a series of declines increases, and periods of no change. The most favorable terms of trade for Kenya have been during periods when there was more trade in its agricultural exports. This would suggest that policies such as import protectionism and overvalued exchange rates have slowed export trade and partly contributes to the overall decline in the recent economic performance.

The terms of trade argument has been unduly restricted to measurement of the commodity terms of trade (NBTT). Since Kenyan exports and productivity in the export sector have grown significantly, the ITT and the SFTT must improve. The capacity to import and the imports per unit of productive resources also have increased. The results for Kenya's factoral terms of trade show that the interpretation of changes in the terms of trade depends very much on the use of the appropriate index.

The alternatively estimated import price indices control for the quality of manufactured imports. After re-adjusting the terms of trade measures, the results revealed a more positive trend than the previous series. The analysis indicates the importance of the import price index in determining the rate of change in the terms of trade. This suggests the importance of better analytical approaches to account for the quality bias in the import statistics.

Figure 6.1: Fisher's Export Price Index



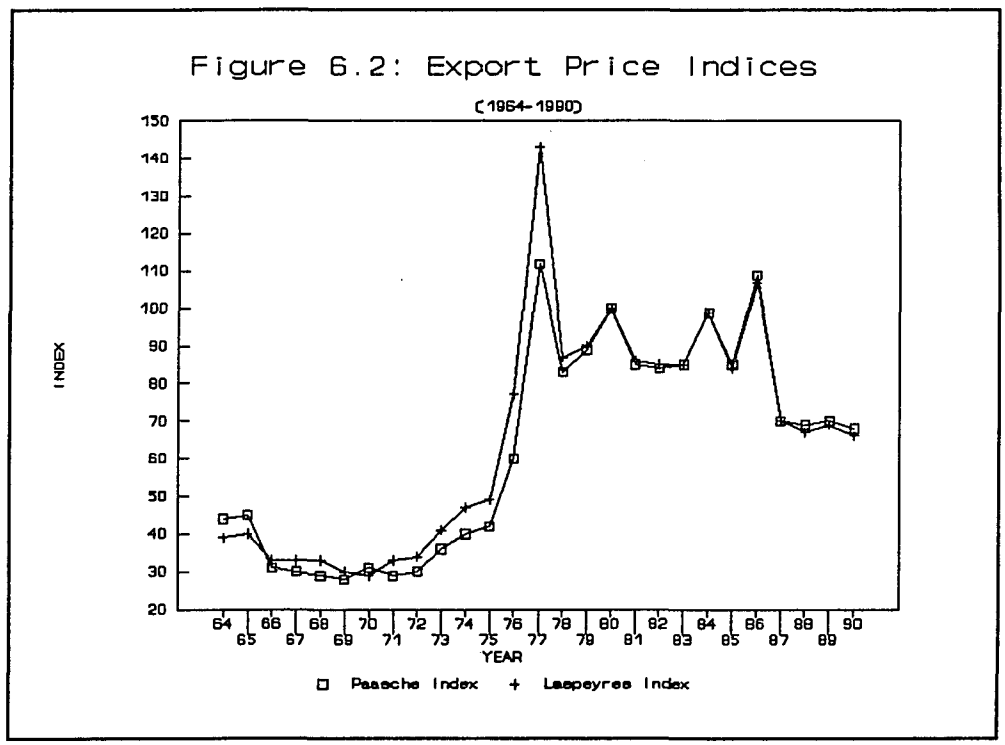


Figure 6.2: Export Price Indices
(1964-1990)
INDEX
150
140
130
120
110
100
90
80
70
60
50
40
30
20
64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
YEAR
Paasche Index
Laspeyres Index

Figure 6.3 Import Price Indices

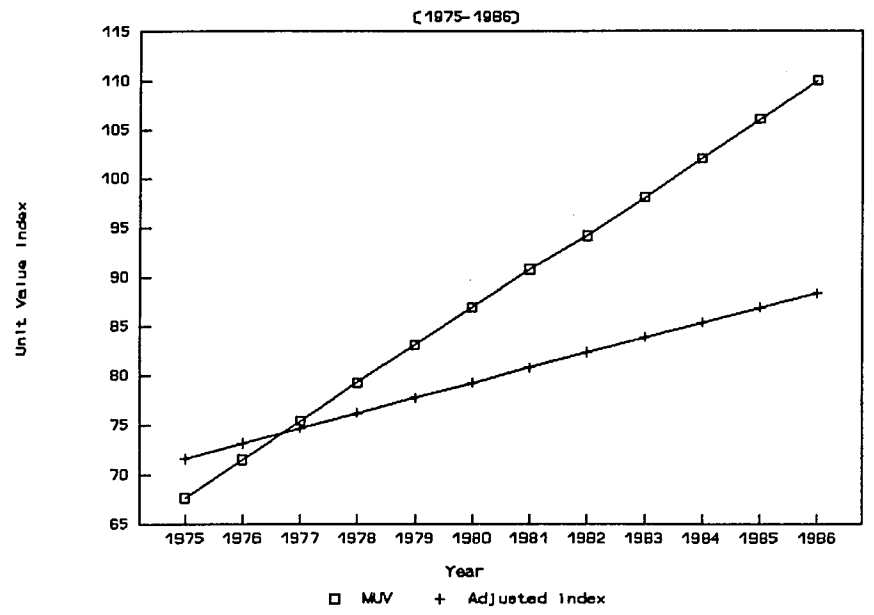
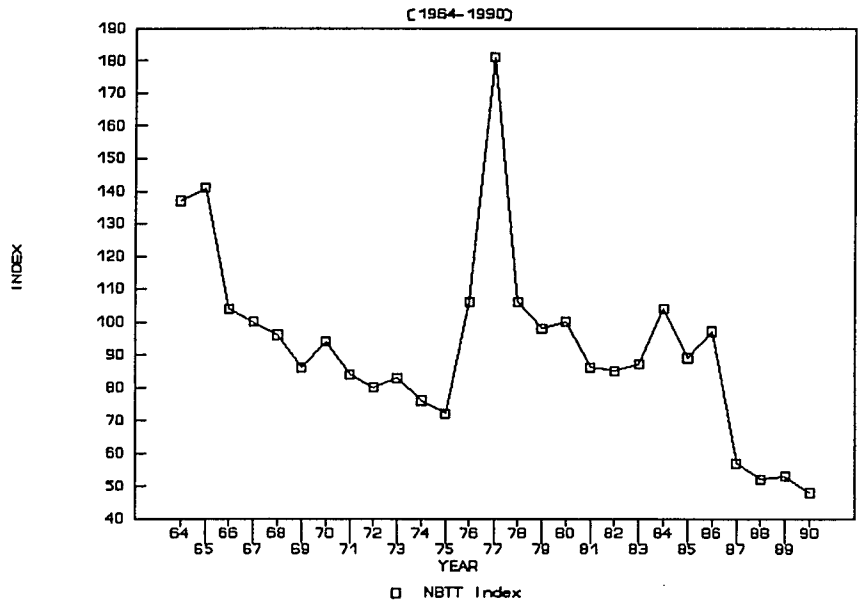


Figure 6.4: NET BARTER TERMS OF TRADE



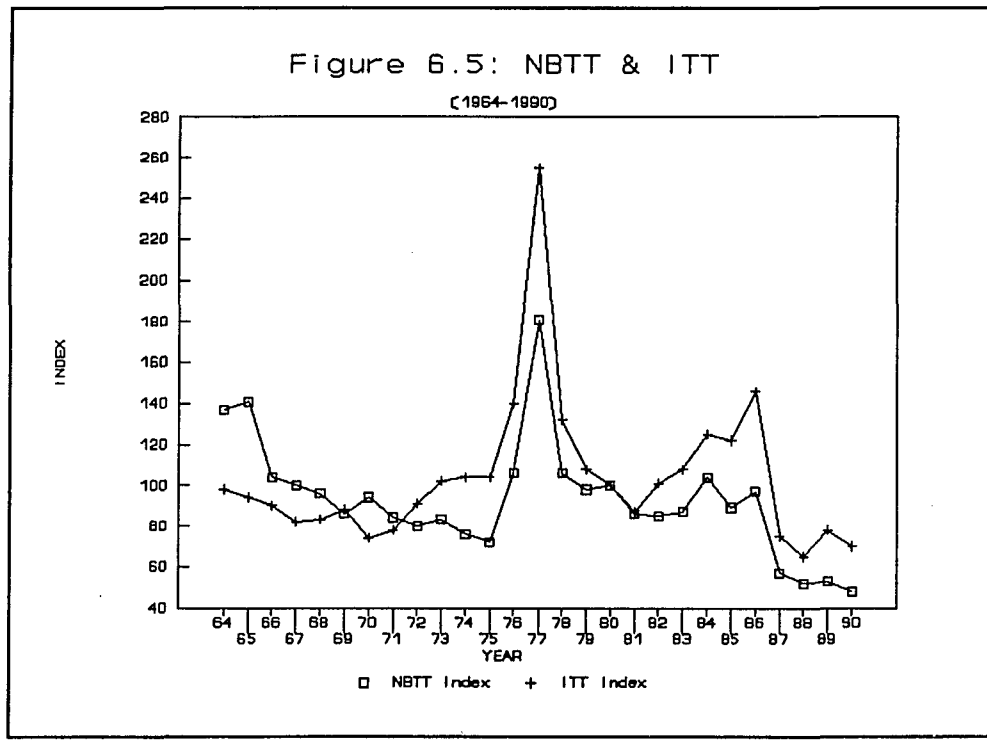


Figure 6.5: NBTT & ITT
(1964-1990)
INDEX
280
260
240
220
200
180
160
140
120
100
80
60
40
64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
YEAR
NBTT Index
ITT Index

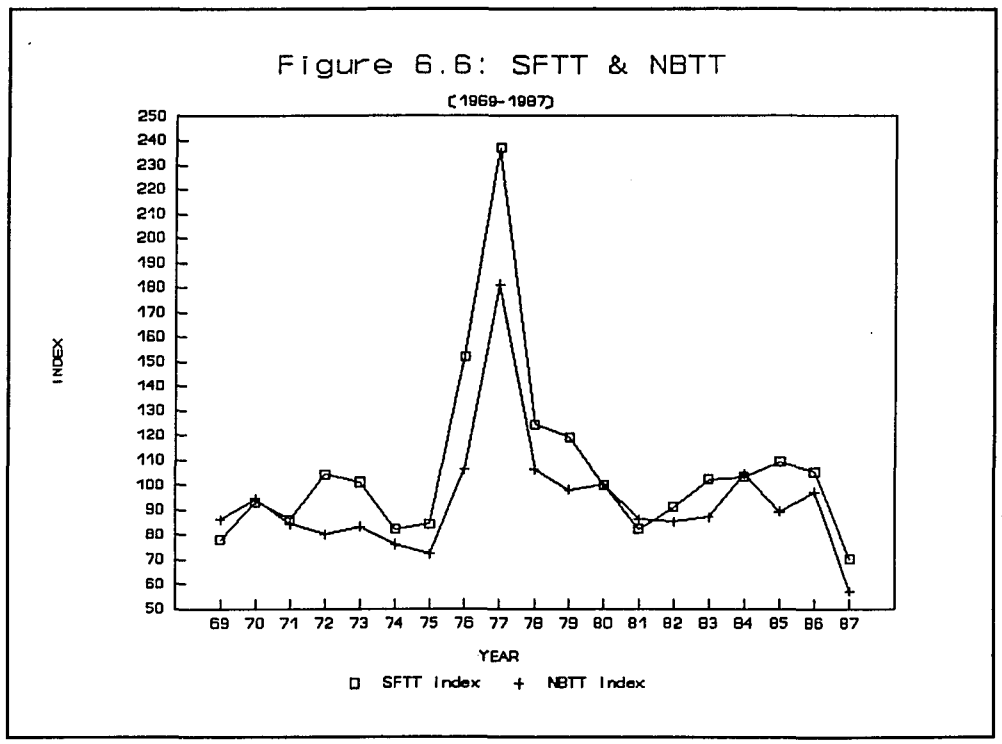


Figure 6.6: SFTT & NBTT
(1969-1987)
INDEX
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87
YEAR
SFTT Index
NBTT Index

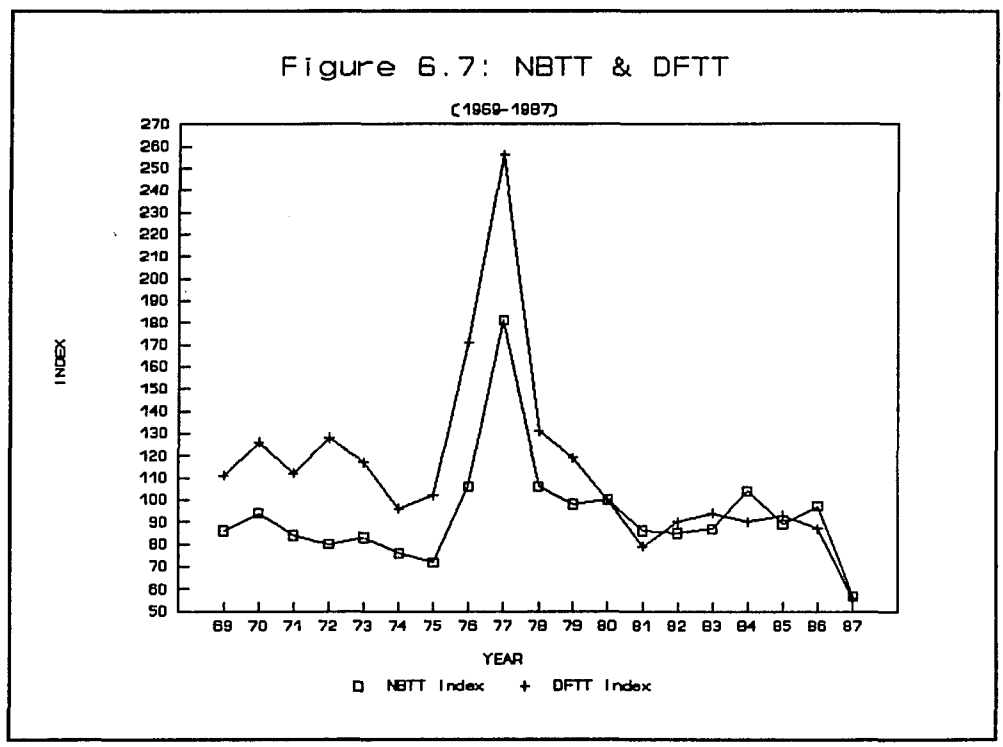
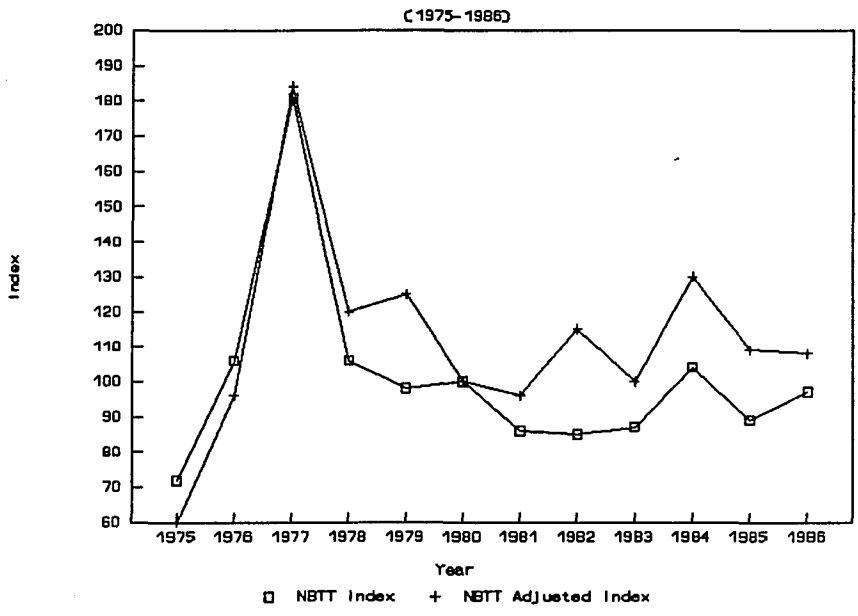


Figure 6.7: NBTT & DFTT
(1969-1987)
INDEX
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87
YEAR
NBTT Index
DFTT Index

Figure 6.8: NET BARTER TERMS OF TRADE



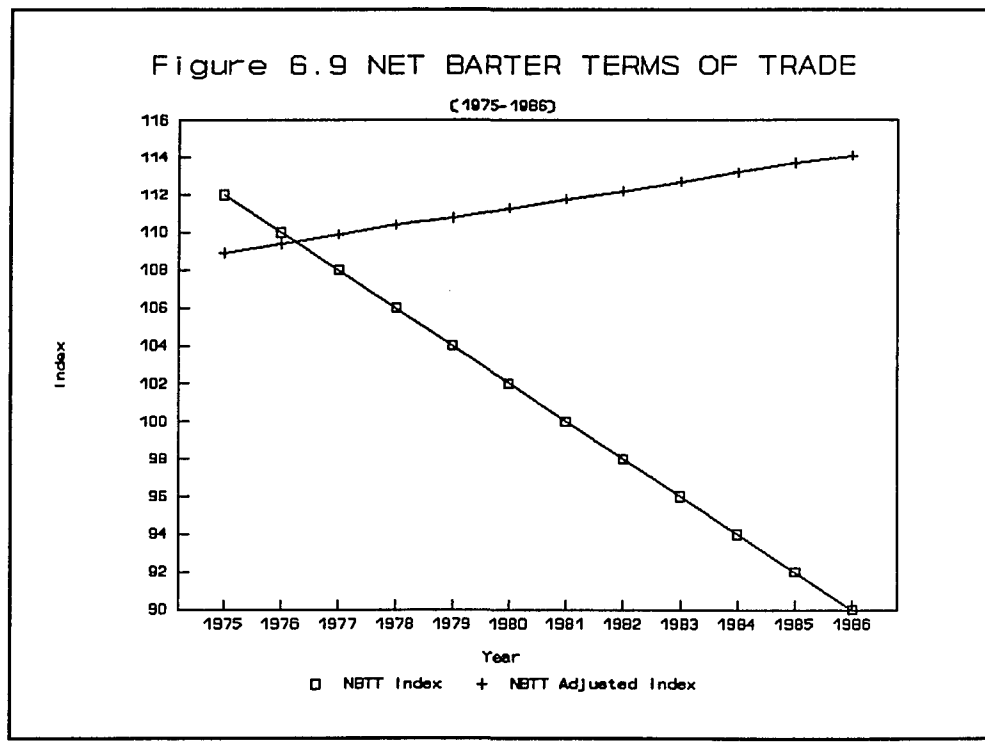
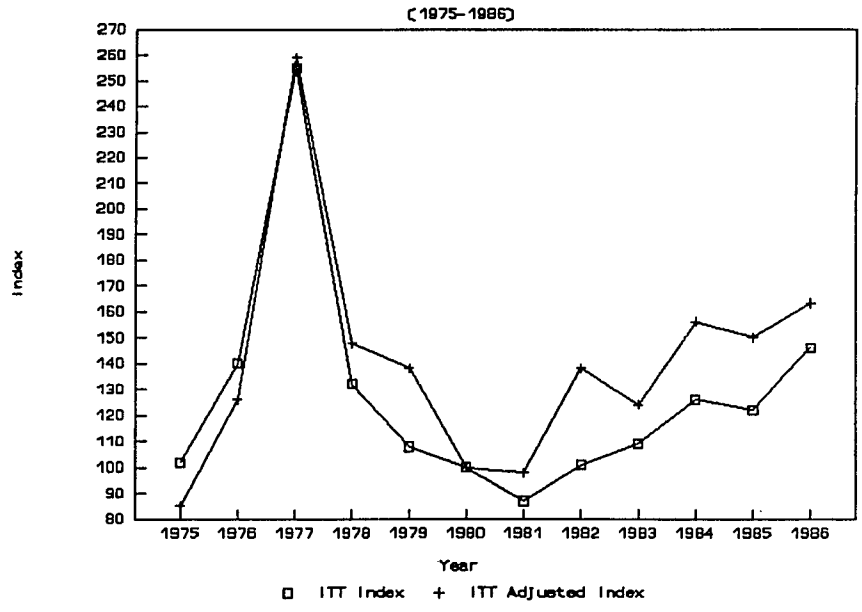


Figure 6.9 NET BARTER TERMS OF TRADE
(1975-1986)
Index
116
114
112
110
108
106
104
102
100
98
96
94
92
90
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
Year
NBTT Index
NBTT Adjusted Index

Figure 6.10: INCOME TERMS OF TRADE



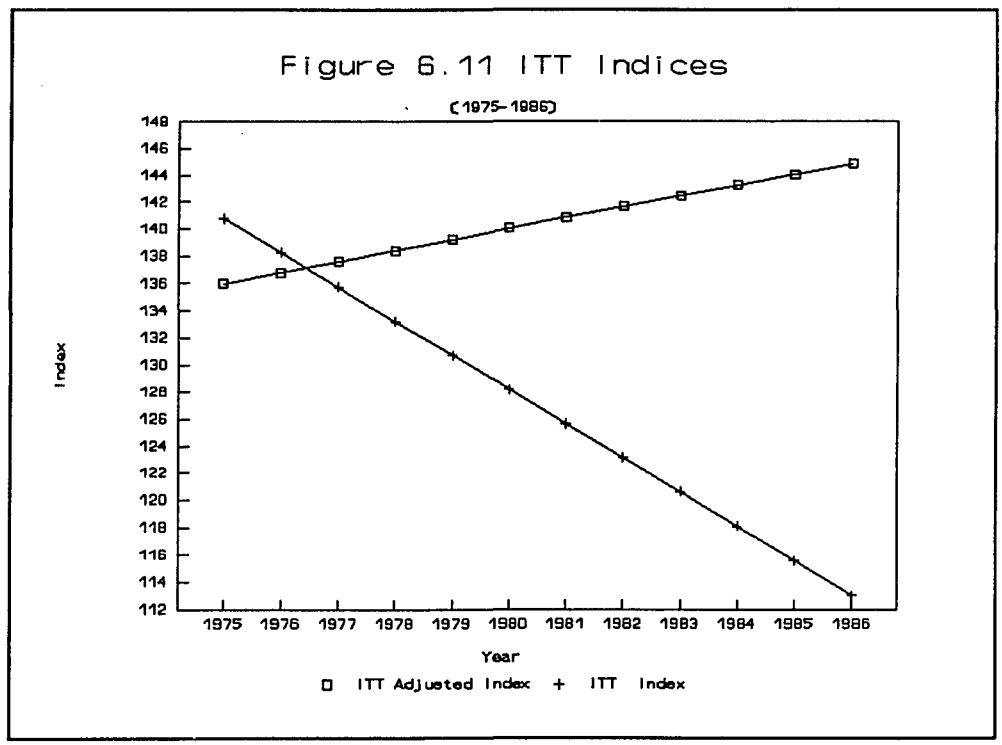
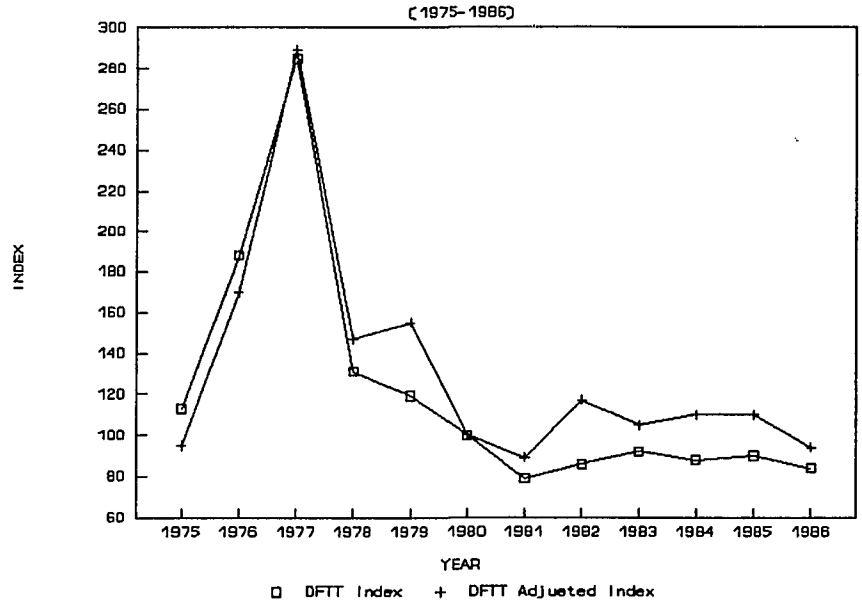


Figure 6.11 ITT Indices
(1975-1986)
Index
148
146
144
142
140
138
136
134
132
130
128
126
124
122
120
118
116
114
112
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
Year
ITT Adjusted Index
ITT Index

Figure 6.12: DFTT INDICES



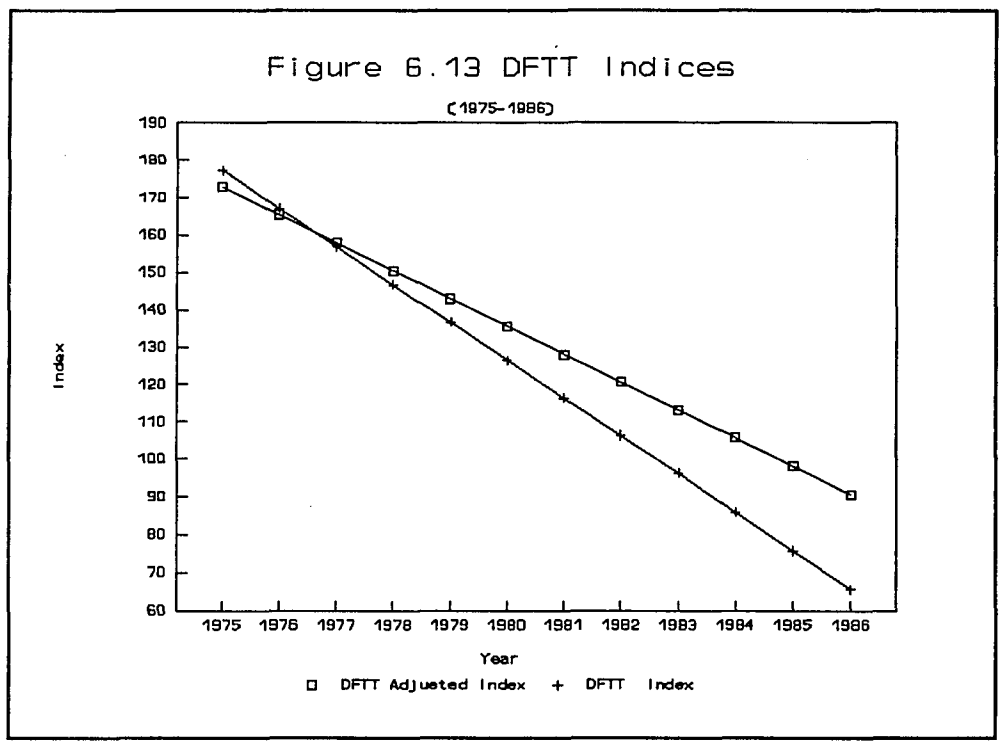


Figure 6.13 DFTT Indices
(1975-1986)
Index
190
180
170
160
150
140
130
120
110
100
90
80
70
60
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
Year
DFTT Adjueted Index
DFTT Index

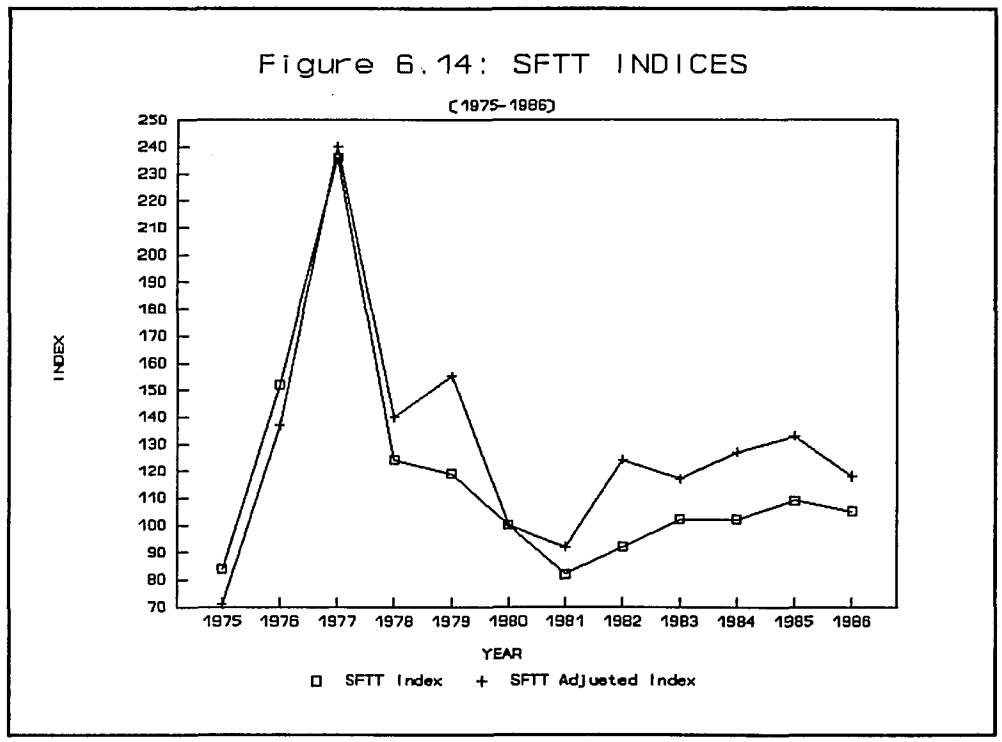


Figure 6.14: SFTT INDICES
(1975-1986)
INDEX
250
240
230
220
210
200
190
180
170
160
150
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130
120
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100
90
80
70
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
YEAR
SFTT Index
SFTT Adjueted Index

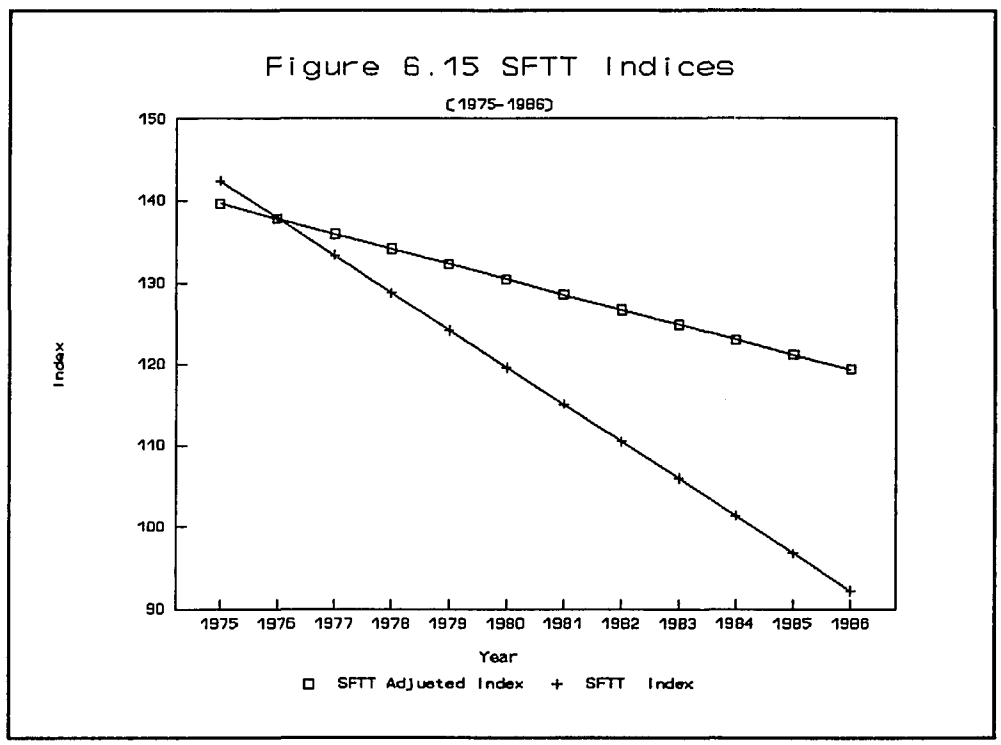
Figure 6.15 SFTT Indices
(1975-1986)
150
140
130
120
110
100
90
Index
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
Year
SFTT Adjusted Index
SFTT Index

CHAPTER 7

EXPORT COMPETITIVENESS UNDER ALTERNATIVE MARKET CONDITIONS

Though exports have served as an engine of growth in many countries, they have not led to sustained development change in others. Some countries have failed to maintain export market shares, whereas others have failed to make significant changes in their economic structure even after increases in exports. This chapter shifts the focus from exogenous factors and discusses some internal policies that contribute to export performances.

To evaluate the effects of domestic policies and market changes on production incentives, regional comparisons of costs and returns are provided for three Kenyan export crops -- tea, pyrethrum, and coffee. Prices in the world markets for coffee, tea and pyrethrum could decline in the future, altering producer profits. A country's macroeconomic policies and other commodity price policies can also alter output and input prices. As a result of these changes, food crops could become profitable than export crops and smallholders would be better off getting out of export crops.

The estimations are based on the Policy Analysis Matrix (PAM). PAM utilizes the concept of economic profit, the value of output minus input costs. Positive profits

increase incomes and act as incentives for producers to expand output. Low or negative profits encourage a decline in output and a shift of resources towards other production activities. PAM's estimates also show the impacts of domestic policies on producer incentives. Policymakers can therefore determine what policy changes are needed to alter incentives and exploit more of the country's production potential (Monke and Pearson, 1989).

Domestic Policies and Export-Led Development

In many developing countries, rapid population growth puts pressure on domestic food production and requires increased imports to maintain availabilities. But countries may be reluctant to rely on trade to satisfy domestic food demand. Food imports affect the balance of payments and reduce foreign exchange reserves. Price fluctuations in the world markets, transmitted to the domestic economy, will affect consumption levels and long-run development plans. Developing countries also are concerned about affordability of food, especially by low income groups. Many therefore prefer domestic polices that will lead to national self-sufficiency. Such views are reinforced by critics who blame export cropping as a root cause of world food and hunger problems.

To achieve self-sufficiency in basic foods, governments intervene via price policies, accumulation of food stocks,

establishment of parastatal marketing organizations and quantitative restrictions on production of alternative crops. Such interventions influence production decisions and profitability via their impact on output and input prices. To keep staple foods cheap (for low income groups and urban consumers), food prices are controlled well below international market prices. But low food prices may be a self defeating development strategy because they lower rural incomes. Also, increasing food supplies often requires increasing producer prices to stimulate food production.

Self-sufficiency in food may be detrimental to long-term development if a country has a comparative advantage in exports rather than food crops. In such cases an expansion of exports would raise national incomes and provide the necessary foreign exchange to import food (Schulter, 1984). Other costs are involved in achieving self-sufficiency: often agricultural subsidies are constrained by government budgets; imports of production inputs and other investment goods for agriculture can drain foreign reserves as effectively as food imports; production costs and output variability can rise when food production is stimulated in regions not well-suited to such crops (Hillman, 1981). Some studies show that domestic food price instability may be more affected by domestic weather variability than by fluctuations in the world market prices.

Domestic Price Policies - Commodity and Macro-Prices

Export performance is influenced by policies that may affect domestic price incentives. Commodity price changes affect relative profitabilities of production activities and hence the resources devoted to exports or nontradable goods. Trade policy often alters relative prices between tradables with quotas or taxes. Export taxes provide an easy way to collect public revenue. However, such taxes also reduce domestic prices below world prices. Excessive export taxes (in excess of economic rents) discourage production and output quality.

Restrictions of imports via tariffs, quotas, or licensing reduces trade and raises domestic prices above international prices. Since imported inputs (intermediate goods and capital goods) are important to many exporting industries, such controls adversely affect export potential. Without access to the same quality and variety of inputs as other competitors, domestic producers have more difficulty to be competitive.

Macro-price polices affect factor markets (land, labor, and capital) and the exchange rate. A common rationale for these policies is that market imperfections exist. If this were the case, resource allocation would be suboptimal since factor prices would not reflect opportunity costs. Common

interventions in the labor market include the imposition of social insurance payments, minimum wage legislation, and special wage and employment policies in the public sector. Such policies usually lead to wages higher than the opportunity cost of labor and reduce the profitability of labor-intensive techniques. The impact on the labor markets also depends on the degree of enforcement. In most developing countries, labor market regulations can be enforced in the formal sector but not in the informal and rural sectors. The result is widening wage differentials and segmented labor markets. High wages in the formal sector encourages reduced employment in that sector and increases the supply of labor to sectors where wages are unregulated. This shift lowers wages in the informal sector and may reinforce comparative advantage in export production if the informal sector produces exports.

Domestic policies also can affect the costs of capital to various producers. Low real interest rates may be instituted for a number of reasons. They are used to encourage investment, to promote domestic industrialization and to help finance the government deficit. Such rates usually do not reflect the scarcity of capital in the domestic economy and often promote the use of capital-intensive processes.

Low rates also encourage excess demand for credit. Resolution of excess demand requires increased government borrowing from foreign capital markets or rationing of available credit among domestic users. Credit rationing usually favors import competing sectors, large-scale farmers, or businesses able to lobby successfully for allocations. Other sectors -- especially in agriculture -- have to look to non-formal sources or local credit institutions that lend at higher rates. This raises production costs and reduces profit margins. Such producers often will be self-financed due to lack of access to credit, limiting their potential to expand.

A more integrated capital market that allows equal access by the export sector and the import substituting sectors is necessary to better exploit comparative advantage. For example, interest rates in the traditional export sectors would be reduced, not by low interest loans to a few cooperative societies, but through well developed rural capital markets and equal access to credit.

Exchange rate policy influences the relative profitability between exports and nontradable goods. In many developing countries, the central bank fixes the rate above the equilibrium rate. Overvaluation increases the demand for tradables and keeps domestic prices for tradables below their opportunity costs. Production of exports is

discouraged and competitiveness in the world market is diminished.

Export declines, coupled with increased imports, encourage deficits in the balance of payments. Controls, such as dual exchange rate systems, then are used to limit imports. Exporters are obligated to sell foreign earnings to the central bank at the official rate, and the bank rations reserves to favored sectors. Other sectors have to turn to the black market to meet foreign exchange needs. The higher black market rate will cause increases in domestic prices of trade-restricted commodities (Balassa, 1989a).

Currency devaluation raises the domestic currency prices of tradables and stimulates export expansion. However, most countries are reluctant to devalue their currencies for fear of higher consumer prices. Despite such consequences, devaluation is often essential to expand export production and gain shares in world markets.

Institutional Policies

At present, many developing countries have set up parastatals or cooperatives to market agricultural exports. Initially these institutions were set up to stabilize producers prices or replace middlemen who controlled the export and import trade. Most parastatals act as monopolies in purchasing, marketing, processing, selling, and exporting agricultural commodities. Lack of trained manpower and poor

systems of internal accountability within these statutory boards often has led to their failure to protect the producer or stimulate an expansion of output (Ghai and Smith, 1987). Instead, export marketing is performed at high costs. Producers undergo long delays before receiving payments.

Domestic Policy and Export Incentives in Kenya

Farm budgets, compiled from a research project that studied the principal commodity systems in Kenya, are used to analyze the impact of domestic polices on farm profits. The analysis covers five of Kenya's main export producing regions -- Uasin Gishu, Kakamega, Nyeri, Kisii and Nakuru. Smallholders produce the bulk of Kenya's exports in most regions. A variety of other crops, such as wheat, maize, beans, tomatoes and bananas also are produced.

Private costs and returns are valued at market prices. Farm inputs include tradables such as pesticides and fertilizers. Domestic factor inputs include land, labor and capital. Returns minus costs indicate the profitability of the activity to the producer. When positive, profits indicate incentives for producers to expand output. Low or negative profits encourage a decline in output and a shift of resources toward other production activities.

Social profits represent the value of outputs minus the costs of tradable inputs and domestic factors when measured

at efficiency prices. The social value of tradables represents their value in world markets; even if produced domestically, they represent potential imports or exports. Domestic factor costs are nontradable. Their prices are determined by the domestic markets. World prices are used implicitly to value domestic factors because the production of output at world prices means that factor prices are linked to world prices. Social profits show what private returns would be without the distorting effects of policy interventions. The use of social prices assumes the economy exploits the gains from trade in order to maximize national incomes.

In the PAM, negative social profits may exist for some production activities. But this does not always mean that the activity is undesirable -- it may serve some nonefficiency objective in the economy. In such cases policymakers may be able to induce social profitability through changes in technology. Social profits can then be compared with investment costs (incurred in developing new technologies or infrastructure) to determine the potential efficiency of the production expansion.

The difference between market and social values represent divergences. These values include the net transfers from various policy interventions: factor market policies which alter the prices of domestic factor inputs;

exchange rate policy which affects prices of tradable commodities relative to prices of nontradables; and taxes or subsidies that alter output and input prices. By evaluating the magnitude of the net transfers in each production activity, policymakers can discern the impacts of different policies on observed costs and returns. The results thus can be used to determine whether an activity is profitable because of the support of policy or because of a natural comparative advantage (Monke and Pearson, 1989).

Simulation Analysis and Results

Commodity price distortions from export taxes have not had a significant effect on farm profits in Kenya. However, the Kenyan government has encouraged import substitution in the manufacturing sector. To make this strategy effective, trade restrictions and foreign exchange rationing are routinely carried out. Such policies result in an appreciation of the exchange rate. An overvalued exchange rate implicitly taxes agricultural exports. Social values in the farm budgets were estimated by depreciating the official exchange rate by 25 percent and raising output prices and prices for tradable inputs relative to their private values.

Producer profits also are influenced by marketing institutions. Marketing boards have control over the marketing of traditional agricultural exports. Producer prices are the residual from export and domestic sales,

after deductions of overheads, marketing costs, and other local taxes. Most farmers complain about payment delays which can last for more than a year after the farmers deliver their produce to the boards.

Export crops use substantial amounts of tradable inputs. But the purchase of farm inputs depends on the returns from the sale of cash crops. Hence, payment delays will encourage reduced input use and poor crop maintenance. This encourages poor export quality and lower quantity, further reducing revenues received. In order to analyze the effects of payment delays on profits, private revenues were discounted in the simulations. The results assumed a delay of one year for both pyrethrum and coffee.

The relative profitability of pyrethrum systems is presented in Table 7.1. Positive profits exist in all regions. Pyrethrum systems in high elevation regions (Molo) have the highest farm-level profit, at Ksh 5.08 per acre. A high pyrethrin content of 1.7 percent indicates the suitability of the crop at higher altitude. Pyrethrum profits are at least 60 percent higher than other nontradable crops like maize, wheat, potatoes. These crops are ill-suited to the local agro-ecological conditions and have low yields.

Farm profits from pyrethrum are by about 40 percent lower in the lower elevation areas. In such districts, like

Table 7.1

Costs and Returns to Pyrethrum Systems ('000 Ksh per acre)

	Revenue*	Input costs		Profit
		Tradable*	Domestic	
Kisii				
Private	7.08	0.13	3.61	3.34
Social	10.65	0.13	3.52	7.00
Divergences	-3.57	0.00	0.09	-3.66
Nakuru				
Molo				
Private	10.19	0.07	5.04	5.08
Social	15.28	0.05	5.08	10.15
Divergences	-5.09	0.02	-0.04	-5.07
Molo				
Private	7.21	0.07	4.47	2.67
Social	10.81	0.05	4.51	6.25
Divergences	-3.60	0.02	-0.04	-3.58
Bahati				
Private	7.23	0.07	4.42	2.74
Social	10.84	0.05	4.48	6.31
Divergences	-3.61	0.02	-0.06	-3.57
Uasin Gishu				
Private	9.87	1.05	6.33	2.49
Social	14.81	1.05	6.98	6.78
Divergences	-4.94	0.00	-0.65	-4.29

*Assuming real rate of interest is 20% and a Social exchange rate 25% higher than 1989/90 value.

Source: Pearson, S. R., Monke E. A., et al. "Agricultural Growth in Kenya: Applications of the Policy Analysis Matrix" Unpublished Manuscript, Stanford University, November, 1992.

Bahati, vegetables have higher profit margins than pyrethrum. But pyrethrum still remains more profitable than coffee. The results imply that farmers in this region are more likely to produce food crops. In Kisii, pyrethrum is more profitable than the maize-beans systems, but less profitable than tea and bananas. Kisii is a high potential region and farmers produce a variety of cash crops. Past studies indicate that despite high profits from pyrethrum, farmers are more likely to produce crops with more stable prices than pyrethrum.

Higher profits in Molo than Kisii district are caused partly by differences in the marketing systems. Nakuru farmers receive direct payments from the Pyrethrum Board of Kenya. Kisii farmers receive final payments via cooperatives, which extract higher deductions that reduce farm profits. In Kisii, producer incentives could be enhanced if the Pyrethrum Board ensured prompt and regular payments. Payment delays reduce the present values of pyrethrum revenues by 16 percent.

There is little use of tradable inputs by small holders. Tradable input costs are less than 3 percent of total production costs. Higher yield levels are possible increases if input use increases. In Uasin Gishu, higher input costs --14 percent of total production costs -- are attributed to larger farms that use higher levels of inputs.

In all systems, social profits are higher than private profits. It is possible to raise farm revenues by about 50 percent in Molo. In Kisii private profits are about one half of the value of social profits. All systems are implicitly taxed by the overvaluation of the exchange rate and substantial income gains could arise from policy change.

The results for the coffee systems are presented in Table 7.2. Private profits are negative or nearly zero in all systems except the coffee estates. Coffee revenues are adversely affected by payment delays, declining by 16 percent. The varying profit margins among the systems also show that cooperative deductions and local county cesses result in farm revenue differentials. The PAM surveys indicated that in some regions, payment delays of two years were common. It is not surprising that low producer prices since 1989 have led to widespread neglect of coffee holdings in most regions, reflecting farmers disenchantment. Smallholder production fell from 78,000 mt in 1988 to 69,500 mt in 1989. Such effects underscore the importance of maintaining producer incentives.

Social revenues are substantially higher than private revenues when the exchange rate is properly valued. For example, in Kakamega, revenue increases by 30 percent, while in Kisii a 50 percent increase occurs. Social profits thus

Table 7.2

Cost and Returns to Coffee Systems ('000 Ksh per acre)

	Revenue*	Input Costs		Profit
		Tradable*	Domestic	
Kakamega District				
Private	8.31	1.73	7.28	-0.70
Social	10.79	2.12	8.73	0.65
Divergences	-2.48	-0.39	1.45	-1.35
Kisii District				
Private	5.38	0.00	5.07	0.31
Social	11.71	0.00	3.98	7.73
Divergences	-6.33	0.00	1.09	-7.42
Nakuru District				
Private	12.05	2.19	9.96	-0.10
Social	17.94	2.69	11.06	4.19
Divergences	-5.89	-0.50	-1.10	-4.29
Estates				
Private	19.83	5.83	10.51	3.49
Social	29.94	7.02	14.10	8.82
Divergences	-10.11	-1.19	-3.59	-5.33
Nyeri District				
Private	8.15	4.30	5.22	-1.37
Social	11.62	5.27	4.72	1.63
Divergences	-3.47	-0.97	0.50	-3.00

*Assuming real rate of interest is 20% and a Social exchange rate 25% higher than the 1989/90 value.

Source: Pearson, S. R., Monke E. A., et al. "Agricultural Growth in Kenya: Applications of the Policy Analysis Matrix" Unpublished Manuscript, Stanford University, November, 1992.

are much larger than private profits.

Among smallholders, tradable input costs are about 20 percent of production costs. The government does not impose import taxes on most agricultural inputs. Social prices are higher than private input costs, due to the difference in exchange rates, but this differential is not substantial at the farm level. Input use was relatively low at the time of the research; therefore, an increase in input costs did not affect farm profits very much.

Tradable inputs are important in the production of coffee, so the higher input use among coffee estates partly explains why they are more socially profitable than smallholder systems. The estates benefit more than smallholders from the input subsidies. Due to better husbandry, the average yield among estates is over 1000 kg/ha and quality is high. In contrast, the average yield for smallholders is about 600 kg/ha.

Domestic input costs range between Ksh 5.00 per acre and Ksh 9.96 per acre among smallholders. A large proportion of these costs represent labor costs. Smallholders are labor-intensive and use little capital. In Nakuru and Kakamega, there are some subsidies to cooperative credit but this program affects only a small percentage of farmers. The effects of such transfers on farmers income thus is not

substantial. Most smallholders are self-financing. Social capital prices are substantially higher than private prices for the coffee estates and the estates are the beneficiaries of domestic cost subsidies.

In Nyeri, farm-level profits for maize and wheat are slightly higher than the coffee systems. Horticultural crops like tomatoes are also more profitable. In Kisii, maize and beans have a higher profit margin per acre. But under a more efficient marketing system, production would expand in favor of coffee.

The results for the tea systems are provided in Table 7.3. Except in one district, farm-level profits were positive. Tea systems show higher profit margins than coffee systems partly because of the more efficient marketing system of the Kenya Tea Development Authority. Nyeri district has the most profitable tea systems with a farm-level profit of Ksh 5,540 per acre. However, milk and vegetables under irrigation, such as tomatoes, potatoes, and cabbages have much higher profit margins. Farm-level profit for Kisii producers is Ksh 2,780 per acre social profit is Ksh 5,840 per acre. Like other export crops, the results show that profit margins can be increased in all systems.

The social costs for tradable inputs are higher than private costs due to subsidies to farm inputs. But the effect of the transfer is not substantial. Most farmers use

Table 7.3

Costs and Returns to Tea Systems ('000 Ksh per acre)

	Revenue*	Input costs		Profit
		Tradable*	Domestic	
Kakamega				
Private	15.75	2.05	10.92	2.78
Social	18.99	3.37	9.78	5.84
Divergences	-3.24	-1.32	1.14	-3.06
Kisii				
Private	10.56	1.72	8.13	0.71
Social	17.37	4.50	6.58	6.29
Divergences	-6.81	-2.78	1.55	-5.58
Nyeri				
Private	16.45	1.51	9.40	5.54
Social	32.13	3.94	8.78	19.40
Divergences	-15.67	-2.43	0.62	13.86

*Assuming a Social exchange rate 25% higher than 1989/90 value

Source: Pearson, S. R., Monke E. A., et al. "Agricultural Growth in Kenya: Applications of the Policy Analysis Matrix" Unpublished Manuscript, Stanford University, November, 1992.

relatively low levels of tradable inputs. Tea is a labor intensive crop. Social costs for domestic inputs, especially labor costs, differ only slightly or are the same as the private values. Differences in profitability among tea producing regions also are due to high transportation costs as a result of poor road systems and an inadequate number of tea processing factories in some regions.

Future Changes in World Prices

To estimate the trends in future profit levels, private revenues were adjusted for expected price changes in world markets. The simulation of the baseline budgets shows the effects of price changes on profits. In the coffee market, if prices are determined by market forces, as they have been since the break down of the agreement in 1989, it is expected that prices will eventually decline by about 10 per cent (World Bank, 1989).

Real tea prices are expected to continue falling especially due to the rapid growth of production among exporters, such as Kenya. Large production levels would also stabilize prices and prevent dramatic price increases in the future. A 10 percent decline in world price seems plausible.

During the 1980s, Kenya's pyrethrum market has become smaller due to competition from synthetic substitutes. The export price that pyrethrum commands partly depends on price differentials with the synthetics. Rather than increase

prices, it will be in Kenya's interest to keep export prices down and expand domestic production in order to meet demand and maintain market share. The simulations assume that export prices would also fall by 10 percent (Winter-Nelson, 1992).

Coffee systems would face the greatest declines in the net returns (Table 7.4). Private profits become negative in all regions. Among smallholders in Nakuru, profits decline by Ksh 1,200 per acre. But farm profits can increase by 154 per cent -- from a loss of Ksh 1,300 per acre to a positive profit margin of Ksh 2,400 per acre -- when the exchange rate is properly valued. In Kakamega, a change in world prices would depress profits by Ksh 830 per acre. But farm profits can increase to Ksh 1,350 per acre with policy change. The impact of export price declines underscores the importance of domestic policy adjustments that will remove distortions.

The results for tea are given in Table 7.5. Despite the negative impact on the margins, profits from tea systems are still positive in all regions except Kisii. In Kakamega horticultural crops like french beans have higher net returns. In Kakamega, profits decline by 56 percent due to the change in world prices. But the impact of policy change on profits is greater (farm profits increase by 69 percent)

Table 7.4

Effects of Price Changes in the Coffee Market

	Private Profits	Change from Baseline*
	('000 Ksh per acre)	
Kakamega		
Private Values	-1.53	-0.83
Kisii		
Private Values	-0.22	-0.53
Nakuru		
Smallholder		
Private Values	-1.30	-1.20
Coffee Estates		
Private Values	-1.30	-4.79
Nyeri		
Private Values	-2.18	-0.81

*Assuming coffee prices decline by 10%

Source: Calculated from Baseline Results

Table 7.5

Effects of Price Changes in the Tea Market

	Private Profits	Change from baseline*
	('000 Ksh per acre)	
Kakamega		
Private Values	1.21	-1.57
Kisii		
Private Values	-0.34	-1.05
Nyeri		
Private Values	3.91	-1.63

*Assuming tea prices decline by 10 percent.

Source: Calculated from Baseline Results.

than the decline in producer profits. In Kisii farm profits decline by Ksh 1,050 per acre as a result of price changes. A change in policy could increase profit margins by over 100 percent, to Ksh 2,740 per acre. In Nyeri, the most profitable tea system, farm profits decline by Ksh 1,630 per acre (a decrease of 30 percent) but farm profits improve to Ksh 13,860 per acre (75 percent increase) if the exchange rate is depreciated.

The effects of price declines on pyrethrum profits are presented in Table 7.6. Despite declines in the export price, profits in all pyrethrum systems would remain positive. Pyrethrum produced in the high elevation areas is still the most profitable system. In Uasin Gishu, an important maize and wheat producing region, profit margins for cereals become higher. In Kisii, producer profits decline by 20 percent when world prices decline. But the magnitude of transfers due to policy distortions is five times greater than the decline caused by changes in world prices. In Molo, profits decline by Ksh 1,010 per acre, but farm profits can increase by Ksh 5,070 per acre when the exchange rate is depreciated.

Table 7.6

Effects of Price Changes in the Pyrethrum Market

	Farm Profits	Change from Baseline*
	('000 Ksh. per Acre)	
Kisii		
Private Values	2.64	0.70
Nakuru		
Molo[a]		
Private Values	4.07	1.01
Molo[b]		
Private Values	1.95	0.72
Bahati		
Private Values	2.02	0.72
Uasin Gishu		
Private Values	1.51	0.98

[a] High Altitude
[b] Low Altitude

*Assuming Pyrethrum Prices fall by 10 percent.

Source: Calculated from Baseline Results

Conclusion

Kenya's trade policy has been more liberal than that of most developing countries. Major exports are not taxed and duties on most agricultural inputs are low or nonexistent. The net transfer effects from these trade policy instruments is therefore small. From the results of the analysis, most export crops are more profitable than the domestic food crops. This implies that the economy would benefit from increases in export production. In the long-run such a production pattern would result in higher income levels in the rural areas.

However, the baseline results show that the net transfers of income as a result of currency overvaluation are substantial. Currency depreciation would result in an increase in export prices. The possibility of lower prices in the world markets implies that Kenya's exchange rate policy is important to producer profits. Changes in policy especially important in the coffee sector, where most farmers face negative profits.

Domestic price margins also are influenced by the marketing boards, which control the marketing of traditional exports. When such institutions perform their services at high costs, these are passed on to farmers and reduces their profits. Changes within the marketing boards is necessary to

give producers a greater share of export value. Maintaining export quality requires the use of pesticides and fertilizers. But payment delays by the marketing boards mean that farmers are unable to purchase such inputs when needed and contributes to poor husbandry. It also raises capital costs for farmers relying on the sale of their cash crops to repay loans.

The fall in world prices has a negative impact on producer returns. However, the ultimate impact of price declines on producer incentives also depends on other factors, such as exchange rate policy. In most regions, output expansion is still possible, even at low world prices, because policy changes can offset the effect of low world prices. Extremely low or prolonged prices in the world market would be required to alter the attraction of cash crops. Exports still remain a most viable source of foreign exchange earnings and the best way to increase household incomes.

CHAPTER 8

CONCLUSION

This thesis reviewed the theoretical literature background on the role of exports in economic development. Most studies show that real income will be higher with trade than without. In most developing countries, agricultural exports makes up a high proportion of gross domestic product. Policies that promote export growth and improvements in agricultural productivity are an important part of development strategies.

The industrialization process -- often initiated under protective trade polices -- is more likely to result in domestic industries whose high costs make them uncompetitive in international markets. Such policies have failed to create an exportable surplus of manufactured goods. The position of agricultural exports has worsened, largely as a result of overvalued exchanges rate and other trade policies that contribute to disincentives in export expansion.

Most studies of the terms of trade use the net barter terms of trade (NBTT) as an indicator of a country's gain from trade. The ratio of export prices to import prices is said to decline over time, adversely affecting national incomes and development. But the NBTT does not provide

conclusive evidence of a secular deterioration in a country's terms of trade. The measure does not allow for improvements in productivity. As long as productivity in the export sector is rising faster than the decline in export prices, real incomes rise despite the deterioration of the NBTT. The factoral and the income terms of trade results show this to be true in the case of Kenya. The income terms of trade (ITT) indicated an improvement in Kenya's terms of trade. The more favorable ITT index was influenced by the positive growth in export volumes. The magnitude of change in the factoral terms of trade -- the single factoral terms of trade (SFTT) and the double factoral term of trade-- also showed a favorable trend for Kenya's exports relative to manufactured imports. Kenya's ability to obtain a greater quantity of imports per unit of factors embodied in its exports was greater than the fall in export prices in most years.

The results also show that the construction of the import price indices influences the terms of trade measures. When no allowances are made for changes in the quality of imports or the introduction of new commodities, import price indices overstate the deterioration of the terms of trade. Price indices were calculated for manufactured commodities whose qualities had not altered much over time. The adjusted indices indicated lesser price increases than the World

Bank's import price index. When the export price indices were deflated with the adjusted import indices, the results revealed that the net barter terms of trade improved rather than declined. The factoral and income terms of trade also showed a more favorable trend for the commodity exports.

Although expansion of export production is potentially favorable to development, the rate at which the export sector grows will depend on domestic policies such as exchange rate policy, institutional policies, and other commodity price policies that affect producer profits. To evaluate the effect of domestic policy on profits, costs and returns for the three Kenyan exports were examined. Most export crops are more profitable than food crops. Private revenues for export crops were similar to social revenues, which shows that domestic prices are often linked to the world prices. However, profits are influenced by the high costs incurred by the marketing boards, especially for coffee and pyrethrum. Payment delays reduce farm profits by almost 20 percent. Low profit margins encourage poor husbandry and export quality.

Changes in the marketing systems could raise profits. The use of border pricing or input subsidies will not elicit much production response if inefficient marketing systems ultimately tax producer profits. The proper management of export revenues would allow the marketing boards to maintain

stable prices to producers even during periods of world price recessions.

The establishment of an import substitution sector has created an overvalued exchange rate that implicitly taxes agricultural exports. By depreciating the foreign exchange rate, it would be possible to raise profits by more than 50 percent in all regions. This would stimulate an expansion in output. This change is especially important in the case of coffee, where producer profits are negative under the current system.

The study also evaluated the impact of changes in the world market on producer profits. Future changes in world market prices will have a negative impact on profits. But the simulation results show that declines in producer profits can be more than offset by a change in exchange rate policy and a reduction in payment delays. The impact of policy distortions on producer profits is far greater than price declines in the world markets. With some policy changes, Kenya has the potential to expand export production even with lower world prices. An overvalued exchange rate and inefficient marketing systems seem to be a greater constraint to development and to the potential benefits of exports than world market conditions.

In most regions, farmers rely on export crops for income. However many farmers will continue to produce food

crops to meet their household needs. It is unlikely that Kenya has the ability to prolong a divergence between producer prices and international market prices for most food crops via price policies. Often, budget constraints have made such policies ineffective or unsustainable. Therefore relative productivity in food and cash crops is important because smallholders produce both commodities. Improvements in productivity could expand food supplies and allow farmers to allocate more of their resources to export crops. With policy adjustments that would make agricultural exports more profitable than they are at present, trade may be made even more effective in raising incomes.

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